

NASA ER-2 Deployment

**Tropical Rainforest Measuring Mission/Brazil
(TRMM/Brazil)**

**Mission Summaries
Flights 99-027 to 99-047**

07 January to 27 February 1999

**Tropical Rainforest Measuring Mission/Brazil
(TRMM/Brazil)**

**FY-1999
Mission Summaries
07 January to 27 February 1999**

99-027	07 January	Ferry -- Dryden to Patrick AFB
99-028	16 January	Ferry -- Patrick AFB to Brasilia
99-029	23 January	Brasilia
99-030	24 January	Brazil
99-031	25-26 January	Brazil (satellite underpass)
99-032	27-28 January	Brazil (TRMM Satellite underpass)
99-033	30-31 January	Brazil (satellite underpass)
99-034	01 February	Brazil
99-035	03 February	Brasilia
99-036	04 February	Brasilia
99-037	5-6 February	Rondonia, Brazil
99-038	7-8 February	Rondonia, Brazil
99-039	8-9 February	Rondonia, Brazil
99-040	10 February	Rondonia, Brazil
99-041	12 February	Brazil
99-042	14 February	Rondonia, Brazil
99-043	17 February	Rondonia, Brazil
99-044	21 February	Rondonia, Brazil
99-045	23-24 February	Brazil (TRMM satellite underpass)
99-046	25 February	Ferry -- Brasilia to Patrick AFB
99-047	26-27 February	Ferry -- Patrick AFB to Dryden

Airborne Science Program

The Airborne Science Program at NASA's Dryden Flight Research Center, Edwards, California, operates two ER-2 high altitude aircraft in support of NASA earth science research. The ER-2s are used as readily deployable high altitude sensor platforms to collect remote sensing and in situ data on earth resources, celestial phenomena, atmospheric dynamics, and oceanic processes. Additionally, these aircraft are used for electronic sensor research and development and satellite investigative support.

The ER-2s are flown from various deployment sites in support of scientific research sponsored by NASA and other federal, state, university, and industry investigators. Data are collected from deployment sites in Kansas, Texas, Virginia, Florida, and Alaska. Cooperative international scientific projects have deployed the aircraft to sites in Great Britain, Australia, Chile, and Norway.

Photographic and digital imaging sensors are flown aboard the ER-2s in support of research objectives defined by the sponsoring investigators. High resolution mapping cameras and digital multispectral imaging sensors are utilized in a variety of configurations in the ER-2s' four pressurized experiment compartments. The following provides a description of the digital multispectral sensor(s) and camera(s) used for data collection during this flight.

Tropical Rainfall Measuring Mission/Brazil (TRMM/Brazil)

Under support from NASA/TRMM, a major ground validation program, known as TRMM/Brazil, was conducted in Amazonia from 1 November 1998 to 28 February 1999. The program focused on the dynamical, microphysical, electrical and diabatic heating characteristics of tropical convection in this region. Data collected in the program will be used in part to validate products from the TRMM satellite as it repeatedly overflies this region. This field program presents an enormous opportunity to address several NSF-based scientific objectives in the study of tropical convection in this region. Indeed, the characteristics of convection in this climatically important region are only poorly known. The NSF investigators consider this project to be a once in a lifetime opportunity to study tropical convection in Amazonia, and to compare the characteristics of convection in this region to other regions in the tropics and mid-latitudes. TRMM/Brazil will be conducted in parallel with the wet season component of the Large Scale Biosphere-Atmosphere Experiment in Amazonia.

The preceding summary was extracted from the Science Overview for the NSF Component of TRMM-LBA/Brazil and may be found on the following website:
http://olympic.atmos.colostate.edu/lba_trmm/overview.html#Abs

Millimeter-Wave Imaging Radiometer

The Millimeter-Wave Imaging Radiometer (MIR) is a nine channel radiometer developed for atmospheric research. Three dual pass band channels are centered about the strongly opaque 183 GHz water absorption line and a fourth channel is located at 150 GHz. These four channels have varying degrees of opacity from which the water vapor profile can be inferred. There are two additional channels located at 89 GHz and 220 GHz. The design includes three additional channels centered about 325 GHz which are supplied by the Georgia Institute of Technology.

Frequencies and polarization were chosen to match those of the Advanced Microwave Sounding Unit-B (AMSU-B) planned for NOAA operational polar weather satellites and the

Earth Observing System (EOS). Frequencies also match closely with those of the Special Sensor Microwave Temperature Sounder-2 (SSMT-2) now aboard the DMSP satellite.

Information regarding this instrument may be obtained from Paul Racette, NASA-Goddard Space Flight Center, Code 975, Greenbelt, MD 20771.

Video Imaging System

The Video Imaging System (VIS) is designed as a visual Line-of -Flight tracker, producing a flight record on standard or Super-VHS, with a selection of ground coverage and image recording intervals. The system consists of a Hitachi KP-C551 Color Camera, A Panasonic AG-6750A Time Lapse Video Recorder, DC/AC Inverter, Control Box, Pressure Suitcase, and a Installation Rack. The system may be configured to acquire natural color or black and white imagery. IRIG-B navigation data is also recorded in flight. The VIS is designed to be installed in either the Pod or Nose of the ER-2 aircraft, using a modified RC-10 Rack. Control circuitry is designed to operate the system using the same controls as the RC-10 camera.

Advanced Microwave Precipitation Radiometer

The Advanced Microwave Precipitation Radiometer (AMPR) is a scanning passive microwave radiometer operating at frequencies of 10, 19, 37, and 85 GHz. The AMPR is configured to fit into the Q-bay of the ER-2 and scans cross-track +/- 45° to the left and right of nadir. The instrument's principle use is for gathering microwave image data of cloud water and precipitation primarily over the ocean. Some data collected also will be used for studies of vegetation, ground moisture, sea surface state, and snow cover. The AMPR is sponsored by Dr. Roy W. Spencer, NASA/MSFC, ES43, Huntsville, Alabama 35812.

ER-2 Doppler Radar

The ER-2 Doppler Radar (EDOP) is an X-band (9.6 GHz) Doppler radar located in the nose of the aircraft. EDOP has two 0.76 meter diameter antennas. One antenna is nadir pointing with pitch stabilization and the other is forward pointing. EDOP will map high resolution time-height sections of reflectivity, vertical hydrometeor velocity, and vertical air motion (when the hydrometeor fallspeed and aircraft motions are removed). The forward beam will measure the linear depolarization ratio (LDR) which provides useful information on orientation of the hydrometeors, hydrometeor phase, and size. For additional information regarding EDOP contact Gerald Heymsfield, NASA Goddard Space Flight Center, Code 912, Goddard Space Flight Center, Greenbelt, MD 20771 (Telephone 301-286-4661). EDOP system specifications are as follows:

Center Frequency	9.6 GHz
Peak Power	20 kW
Duty Cycle	.01 max.
Pulse Length	.25, 1.0 ms
Antenna Diameter	.76 m
Antenna Beamwidth	2.9°
First Side-lobe Level	<-30 dB
Cross Polarization Level	<-38 dB
Receiver Dynamic Range	110 dB
Number of Doppler Channels	2

Number of Log Reflectivity Channels3

Nadir Beam:

Transmit Polarization	Horizontal
Received Polarization	Copolarized

Forward Beam:

Transmit Polarization	Vertical
Received Polarization	Copolarized and Cross-polarized

MODIS Airborne Simulator

The MODIS Airborne Simulator (MAS) is a modified Daedalus multispectral scanner configured to replicate the capabilities of the Moderate-Resolution Imaging Spectrometer (MODIS), an instrument to be orbited on an EOS platform. MODIS is designed for the measurement of biological and physical processes and atmospheric temperature sounding. The MODIS Airborne Simulator records fifty 16-bit channels of multispectral data and is configured as follows:

Spectral Channel	Band center (μm)	Bandwidth (μm)	Spectral Range
1	0.4649	0.0397	0.4451-0.4848
2	0.5494	0.0417	0.5285-0.5703
3	0.6550	0.0511	0.6294-0.6805
4	0.7024	0.0415	0.6816-0.7231
5	0.7431	0.0420	0.7221-0.7641
6	0.8248	0.0427	0.8034-0.8461
7	0.8667	0.0414	0.8460-0.8874
8	0.9072	0.0409	0.8867-0.9276
9	0.9476	0.0397	0.9277-0.9674
10	1.6422	0.0519	1.6163-1.6682
11	1.6975	0.0505	1.6722-1.7228
12	1.7499	0.0506	1.7245-1.7752
13	1.8014	0.0491	1.7768-1.8259
14	1.8548	0.0489	1.8303-1.8792
15	1.9044	0.0487	1.8801-1.9288
16	1.9553	0.0483	1.9312-1.9794
17	2.0048	0.0487	1.9804-2.0291
18	2.0551	0.0484	2.0309-2.0793
19	2.1037	0.0486	2.0794-2.1280
20	2.1532	0.0483	2.1291-2.1774
21	2.2019	0.0481	2.1779-2.2259
22	2.2522	0.0486	2.2278-2.2675
23	2.3021	0.0487	2.2777-2.3265
24	2.3512	0.0476	2.3274-2.3750
25	2.4005	0.0483	2.3764-2.4246

Spectral Channel	Band center (μm)	Bandwidth (μm)	Spectral Range
26	3.1192	0.1616	3.0384-3.2000
27	3.2809	0.1486	3.2066-3.3552
28	3.4330	0.1617	3.3521-3.5138
29	3.5940	0.1539	3.5170-3.6709
30	3.7449	0.1449	3.6724-3.8174
31	3.9069	0.1602	3.8267-3.9870
32	4.0707	0.1554	3.9929-4.1484
33	4.1699	0.0669	4.1365-4.2034
34	4.4029	0.1255	4.3401-4.4656
35	4.5404	0.1512	4.4648-4.6160
36	4.6979	0.1591	4.6184-4.7775
37	4.8536	0.1516	4.7778-4.9294
38	5.0033	0.1468	4.9298-5.0767
39	5.1588	0.1400	5.0888-5.2288
40	5.3075	0.1327	5.2412-5.3738
41	5.3977	0.0755	5.3590-5.4365
42	8.5366	0.3950	8.3391-8.7341
43	9.7224	0.5365	9.4541-9.9906
44	10.5071	0.4579	10.278-10.736
45	11.0119	0.4710	10.776-11.247
46	11.9863	0.4196	11.776-12.196
47	12.9013	0.3763	12.713-13.089
48	13.2702	0.4584	13.041-13.500
49	13.8075	0.5347	13.540-14.075
50	14.2395	0.3775	14.051-14.428

NOTE: Bandpass centers approximate

Sensor/Aircraft Parameters:

Spectral Bands: 50 (digitized to 16-bit resolution)
 IFOV: 2.5 mrad

Ground Resolution: 163 feet (50 meter at 65,000 feet)
Swath Width: 22.9 mi/19.9 nmi (36 km)
Total Scan Angle: 85.92°
Pixels/Scan Line: 716
Scan Rate: 6.25 scans/second
Ground Speed: 400 kts (206 m/second)
Roll Correction: Plus or minus 3.5 degrees (approx.)

Lightning Instrument Package

The Lightning Instrument Package (LIP) comprises a set of optical and electrical sensors with a wide range of temporal, spatial, and spectral resolution to observe lightning and investigate electrical environments within and above thunderstorms. The instruments provide measurements of the air conductivity and vertical electric field above thunderstorms and provide estimates of the storm electric currents. In addition, LIP will detect total storm lightning and differentiate between intracloud and cloud-to-ground discharges. These data will be used in studies of lightning/storm structure and lightning precipitation relationships. The LIP is sponsored by Dr. Richard Blakeslee, NASA/MSFC, ES43, Huntsville, Alabama 35812.

Flight Documentation and Data Archive Searches

The following is the web site for flight documentation as published by the Airborne Sensor Facility at NASA Ames Research Center: <http://asapdata.arc.nasa.gov/er-2fsr.html>

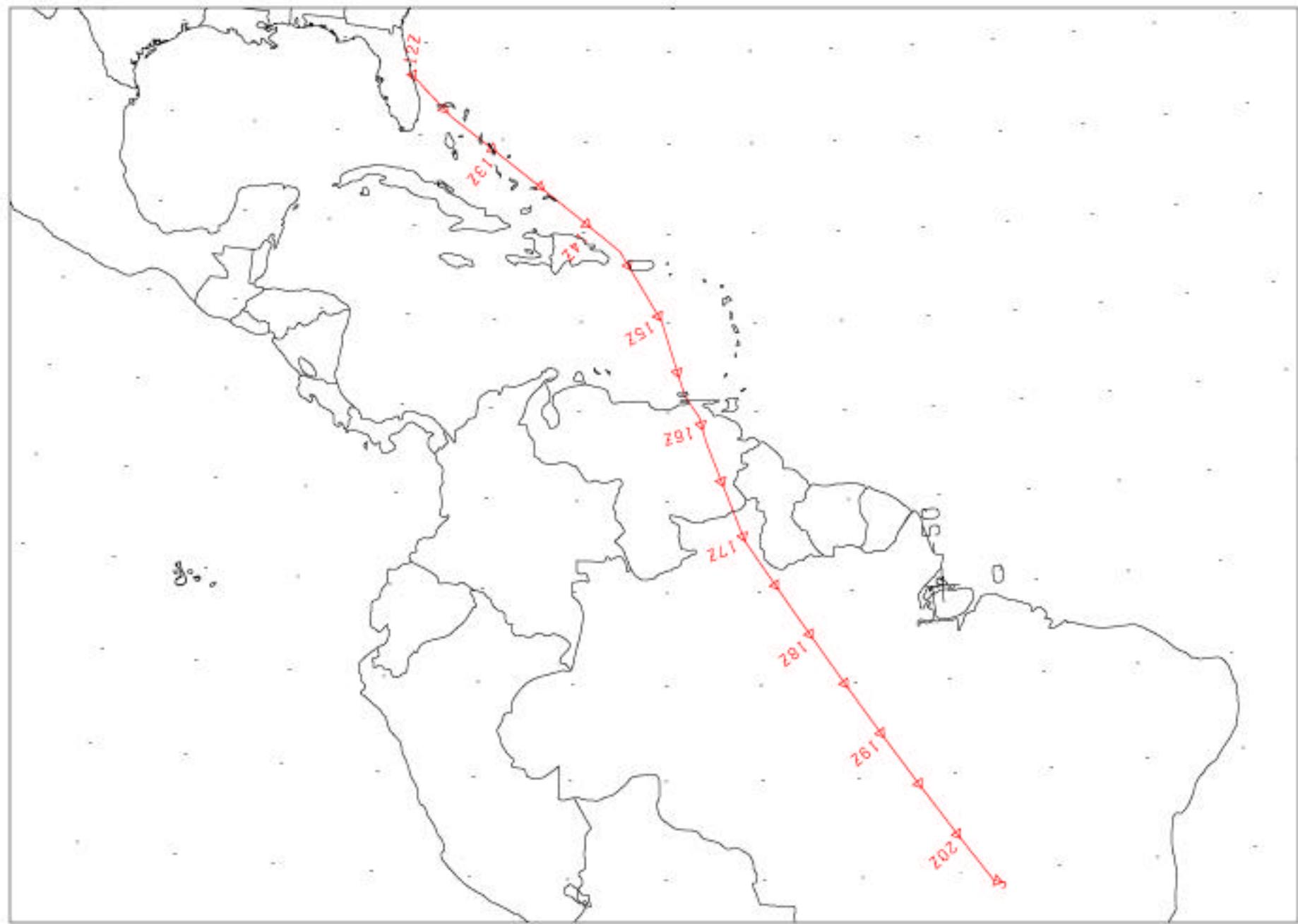
Additional information regarding flight documentation to include data archive searches, data availability, sensor parameters, and areas of coverage may be obtained from the following:

Airborne Sensor Facility
MS 240-6
NASA Ames Research Center
Moffett Field, CA 94035-1000
Telephone: (650) 604-6252 (FAX 4987)

TRMM BRAZIL
FLIGHT SUMMARY REPORT

Investigator(s): Heymsfield NASA GSFC / Guillory NASA MSFC

Flight	Date(s)	Area(s) Covered	MAS50	VIS	EDOP	AMPR	LIP	MIR
99-027	07 Jan 1999	Ferry NASA DFRC --> Patrick AFB FL.	None	None	None	None	None	None
99-028	16 Jan 1999	Ferry Patrick AFB FL. --> Brasilia Brazil	None	None	None	None	None	None
99-029	22 Jan 1999	Brasilia Brazil (FCF)	X	X	X	X	X	X
99-030	24 Jan 1999	Rondonia Brazil (S-Pol Network)	X	X	X	X	X	X
99-031	25-26 Jan 1999	Rondonia Brazil (TRMM Underpass)	X	X	X	X	X	X
99-032	27-28 Jan 1999	Rondonia Brazil (TRMM Underpass)	X	X	X	X	X	X
99-033	30-31 Jan 1999	Rondonia Brazil (TRMM Underpass)	X	X	X	X	X	X
99-034	01 Feb 1999	Rondonia Brazil (S-Pol Network)	X	X	X	X	X	X
99-035	03 Feb 1999	Brasilia (Pilot Pro)	None	X	X	X	X	X
99-036	04 Feb 1999	Brasilia (Pilot Pro)	None	X	X	X	X	X
99-037	05-06 Feb 1999	Rondonia Brazil (S-Pol Network)	X	X	X	X	X	X
99-038	07-08 Feb 1999	Rondonia Brazil (S-Pol Network)	X	X	X	X	X	X
99-039	09-10 Feb 1999	Rondonia Brazil (S-Pol Network)	X	X	X	X	X	X
99-040	10 Feb 1999	Rondonia Brazil (S-Pol Network)	X	X	X	X	X	X
99-041	12 Feb 1999	Rondonia Brazil (S-Pol Network)	None	X	X	X	X	X
99-042	14 Feb 1999	Rondonia Brazil (S-Pol Network)	X	X	X	X	X	X
99-043	17 Feb 1999	Rondonia Brazil (S-Pol Network)	X	X	X	X	X	X
99-044	21 Feb 1999	Rondonia Brazil (S-Pol Network)	X	X	X	X	X	X
99-045	23-24 Feb 1999	Rondonia Brazil (TRMM Underpass)	X	X	X	X	X	X
99-046	25 Feb 1999	Ferry Brasilia Brazil --> Patrick AFB FL.	None	None	X	X	X	X
99-047	26-27 Feb 1999	Ferry Patrick AFB FL. --> NASA DFRC	None	None	X	X	X	X



FLIGHT 99-028

16 JANUARY 1999

A/C 806

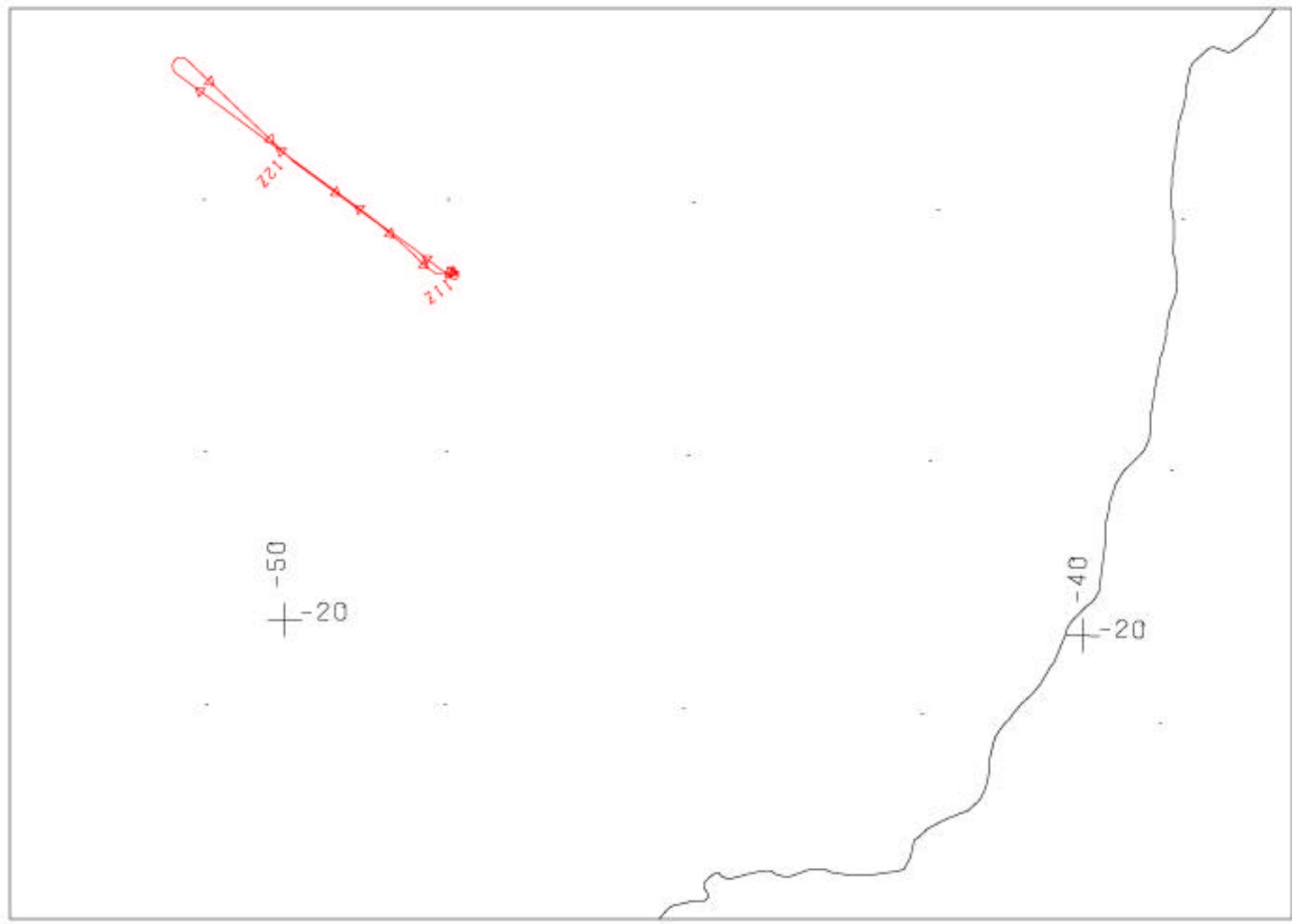
TRMM/BRAZIL

FERRY PATRICK AFB --> BRASILIA

MODIS AIRBORNE SIMULATOR (MAS) FLIGHT LINE INFORMATION FOR 23-JAN-1999 FLIGHT 99-029

START OF FLIGHT LINE							END OF FLIGHT LINE						
LINE	TIME	LAT	LON	SOLAR	START		TIME	LAT	LON	SOLAR	SCAN		
	HH:MM:SS	DEG	DEG	ZEN	AZIM	HEADING		HH:MM:SS	DEG	DEG	ZEN	AZIM	LINES
1	11:29:30	-14.315	-50.188	57.9	104.4	308.73		11:37:29	-13.736	-50.984	56.9	104.6	2987
2	11:37:35	-13.732	-50.990	56.9	104.6	307.12		11:40:27	-13.532	-51.262	56.5	104.7	1072
3	11:44:13	-13.339	-51.177	55.7	104.7	131.16		11:59:20	-14.389	-50.062	50.9	103.6	5661

NUMBER OF FILES FOR THIS FLIGHT = 3
 TOTAL NUMBER OF SCAN LINES = 9720
 DATE THESE FILES WERE PROCESSED = 19-Feb-99
 DATE THIS LIST WAS CREATED = 19-Feb-99
 GRANULE VERSION = 9



FLIGHT 99-029

23 JANUARY 1999

R/C 806

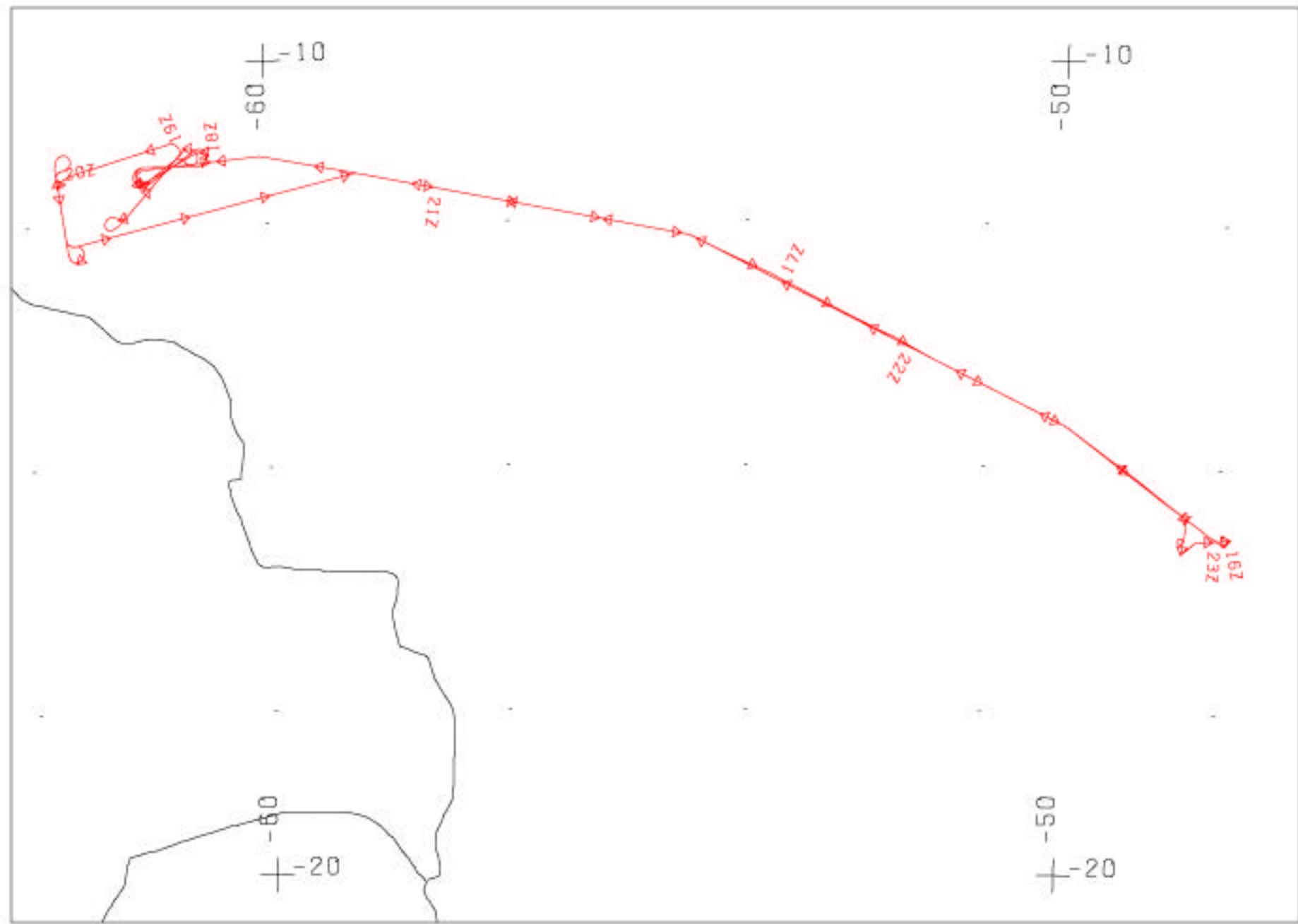
TRMM/BRAZIL

PILOT PRO

MODIS AIRBORNE SIMULATOR (MAS) FLIGHT LINE INFORMATION FOR 24-JAN-1999 FLIGHT 99-030

START OF FLIGHT LINE						END OF FLIGHT LINE						
LINE	TIME	LAT	LON	SOLAR	START	TIME	LAT	LON	SOLAR	SCAN		
	HH:MM:SS	DEG	DEG	ZEN	AZIM	HEADING	HH:MM:SS	DEG	DEG	ZEN	AZIM	LINES
1	17:40:19	-11.535	-58.156	24.4	248.4	281.00	17:55:48	-11.180	-60.037	26.4	248.8	5789
2	17:56:18	-11.179	-60.099	26.4	248.8	263.00	18:05:21	-11.289	-61.211	27.4	249.6	3386
3	18:05:28	-11.290	-61.225	27.4	249.6	264.15	18:07:40	-11.316	-61.495	27.7	249.8	824
4	18:11:09	-11.505	-61.467	28.4	251.0	58.11	18:18:18	-11.086	-60.870	30.8	251.1	2675
5	18:21:57	-11.282	-60.846	31.6	251.3	269.48	18:27:12	-11.284	-61.495	32.2	251.5	1964
6	18:30:46	-11.458	-61.468	33.0	252.5	63.82	18:37:43	-11.119	-60.854	35.3	252.5	2601
7	18:40:45	-11.282	-60.853	36.0	252.6	270.01	18:45:59	-11.284	-61.500	36.6	252.7	1959
8	18:50:26	-11.453	-61.452	37.6	253.5	57.31	18:54:32	-11.201	-61.115	39.0	253.4	1540
9	19:00:48	-11.136	-61.052	40.4	253.3	219.99	19:03:28	-11.369	-61.269	40.8	253.6	1004
10	19:03:33	-11.374	-61.272	40.8	253.6	217.02	19:09:09	-11.870	-61.718	41.6	254.2	2096
11	19:14:39	-11.976	-61.813	42.9	254.7	45.45	19:25:24	-11.167	-61.085	46.3	254.1	4022
12	19:28:03	-11.019	-61.230	46.8	253.8	252.02	19:38:03	-11.359	-62.402	47.9	254.2	3742
13	19:40:32	-11.561	-62.581	48.2	254.5	165.56	19:45:50	-12.151	-62.501	49.3	255.0	1983
14	19:51:38	-12.316	-62.478	51.0	255.1	359.42	20:00:13	-11.404	-62.602	53.1	254.4	3213
15	20:06:24	-11.296	-62.619	54.3	254.4	165.41	20:10:21	-11.727	-62.559	55.2	254.7	1478
16	20:10:24	-11.735	-62.558	55.2	254.7	166.07	20:14:11	-12.154	-62.501	56.0	254.9	1417
17	20:15:46	-12.239	-62.383	56.6	255.0	75.66	20:21:29	-12.109	-61.827	58.5	254.8	2139
18	20:21:52	-12.100	-61.786	58.7	254.8	76.55	20:34:28	-11.800	-60.522	62.9	254.4	4715
19	20:34:52	-11.791	-60.485	63.0	254.4	76.18	20:50:34	-11.406	-58.903	68.3	253.7	5866
20	20:51:18	-11.407	-58.833	68.5	253.7	97.96	21:13:25	-11.845	-56.532	75.7	253.0	8230

NUMBER OF FILES FOR THIS FLIGHT = 20
 TOTAL NUMBER OF SCAN LINES = 60643
 DATE THESE FILES WERE PROCESSED = 19-Feb-99
 DATE THIS LIST WAS CREATED = 19-Feb-99
 GRANULE VERSION = 9



FLIGHT 99-030

24 JANUARY 1999

R/C 806

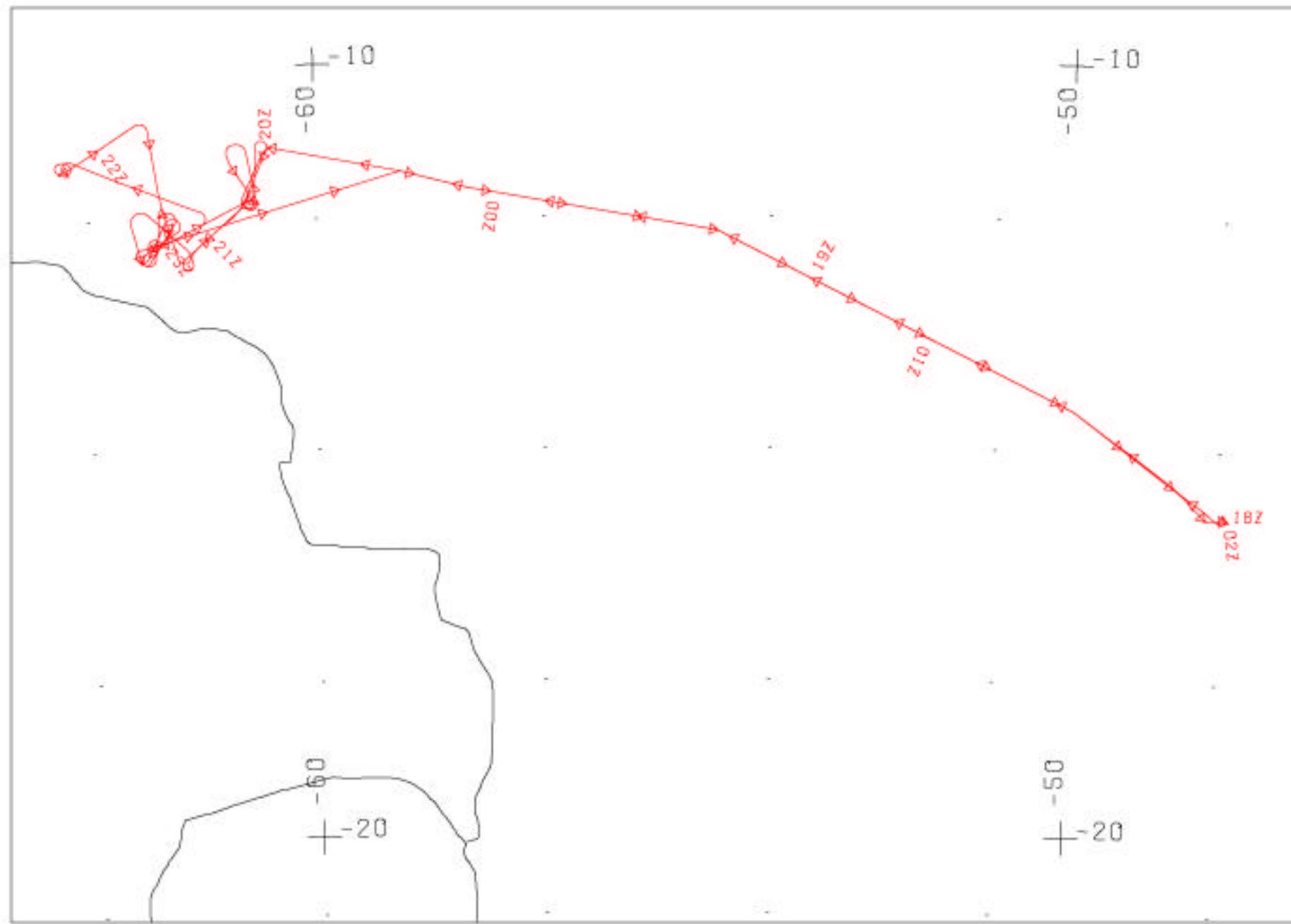
TRMM/BRAZIL

MASSD / VIS / EDDP / AMPR / MIR / LIP

MODIS AIRBORNE SIMULATOR (MAS) FLIGHT LINE INFORMATION FOR 25-JAN-1999 FLIGHT #99-031

START OF FLIGHT LINE							END OF FLIGHT LINE						
LINE	TIME	LAT	LON	SOLAR	START		TIME	LAT	LON	SOLAR	SCAN		
	HH:MM:SS	DEG	DEG	ZEN	AZIM	HEADING		HH:MM:SS	DEG	DEG	ZEN	AZIM	LINES
1	19:39:47	-11.590	-58.103	52.4	254.8	286.77	19:45:50	-11.406	-58.834	53.2	254.6	2267	
2	19:46:02	-11.400	-58.855	53.2	254.6	283.35	19:59:43	-11.086	-60.527	54.9	254.4	5117	
3	20:01:35	-11.193	-60.700	55.0	254.6	199.58	20:06:35	-11.718	-60.951	55.8	254.9	1871	
4	20:09:43	-11.772	-60.803	56.9	254.9	8.71	20:11:15	-11.608	-60.796	57.3	254.8	575	
5	20:11:20	-11.600	-60.795	57.3	254.8	8.65	20:16:16	-11.067	-60.773	58.7	254.4	1846	
6	20:19:18	-11.132	-60.642	59.2	254.4	197.46	20:25:06	-11.748	-60.913	60.2	254.7	2170	
7	20:28:32	-11.737	-60.776	61.4	254.6	356.25	20:34:05	-11.134	-60.893	62.7	254.3	2077	
8	20:38:55	-11.294	-61.103	63.4	254.3	142.38	20:42:35	-11.611	-60.895	64.4	254.4	1372	
9	20:44:11	-11.775	-60.910	64.7	254.4	215.29	20:46:10	-11.956	-61.064	65.0	254.4	743	
10	20:46:38	-11.989	-61.112	65.1	254.4	228.46	20:53:02	-12.494	-61.709	65.9	254.6	2395	
11	20:57:49	-12.403	-61.597	67.3	254.5	50.91	21:06:02	-11.867	-60.980	69.9	254.0	3074	
12	21:10:20	-11.788	-60.935	70.9	253.8	241.81	21:19:19	-12.283	-61.930	71.9	253.8	3362	
13	21:23:44	-12.361	-62.079	72.9	253.8	62.35	21:30:19	-12.067	-61.502	75.0	253.4	2464	
14	21:32:27	-11.895	-61.513	75.6	253.2	294.01	21:42:03	-11.473	-62.594	77.0	252.9	3593	
15	21:42:33	-11.454	-62.645	77.1	252.9	296.82	21:47:33	-11.220	-63.188	77.8	252.8	1872	
16	21:55:18	-11.331	-63.263	79.4	252.6	61.84	22:05:18	-10.797	-62.414	82.8	252.0	3742	
17	22:08:11	-10.832	-62.184	83.5	251.9	166.08	22:15:21	-11.632	-62.059	85.0	251.7	2682	
18	22:15:35	-11.659	-62.054	85.0	251.7	161.66	22:17:21	-11.852	-62.007	85.4	251.6	662	
19	22:17:52	-11.909	-61.992	85.5	251.6	157.95	22:20:53	-12.226	-61.895	86.2	251.4	1130	
20	22:21:52	-12.329	-61.863	86.5	251.4	157.33	22:23:24	-12.487	-61.813	86.8	251.3	575	
21	22:26:40	-12.385	-61.689	88.0	251.1	316.92	22:27:59	-12.279	-61.804	88.2	251.0	494	
22	22:31:01	-12.040	-62.066	88.8	250.9	316.27	22:32:31	-11.924	-62.197	89.0	250.9	562	
23	22:36:47	-12.192	-62.385	89.5	250.7	159.75	22:39:44	-12.508	-62.303	90.1	250.6	1105	
24	22:41:50	-12.499	-62.148	91.0	250.3	35.79	22:46:16	-12.111	-61.893	92.4	250.1	1659	
25	22:51:13	-12.092	-62.055	93.1	249.9	181.65	22:54:52	-12.504	-62.106	93.8	249.7	1367	
26	22:57:56	-12.432	-62.237	94.5	249.4	57.55	23:02:52	-12.146	-61.810	96.2	249.1	1802	
27	23:06:20	-12.070	-61.996	96.7	249.0	201.78	23:09:16	-12.383	-62.147	97.1	248.8	1098	
28	23:14:38	-12.334	-62.151	98.4	248.4	74.62	23:19:00	-12.215	-61.720	99.8	248.0	1635	
29	23:19:20	-12.205	-61.685	100.0	247.9	72.98	23:32:21	-11.845	-60.415	104.2	246.7	4871	
30	23:32:23	-11.845	-60.416	104.2	246.7	74.38	23:45:08	-11.489	-59.185	108.3	245.4	4782	

NUMBER OF FILES FOR THIS FLIGHT = 30
 TOTAL NUMBER OF SCAN LINES = 62964
 DATE THESE FILES WERE PROCESSED = 19-Feb-99
 DATE THIS LIST WAS CREATED = 22-Feb-99
 GRANULE VERSION = 9



FLIGHT 99-031

25-26 JANUARY 1999

A/C 806

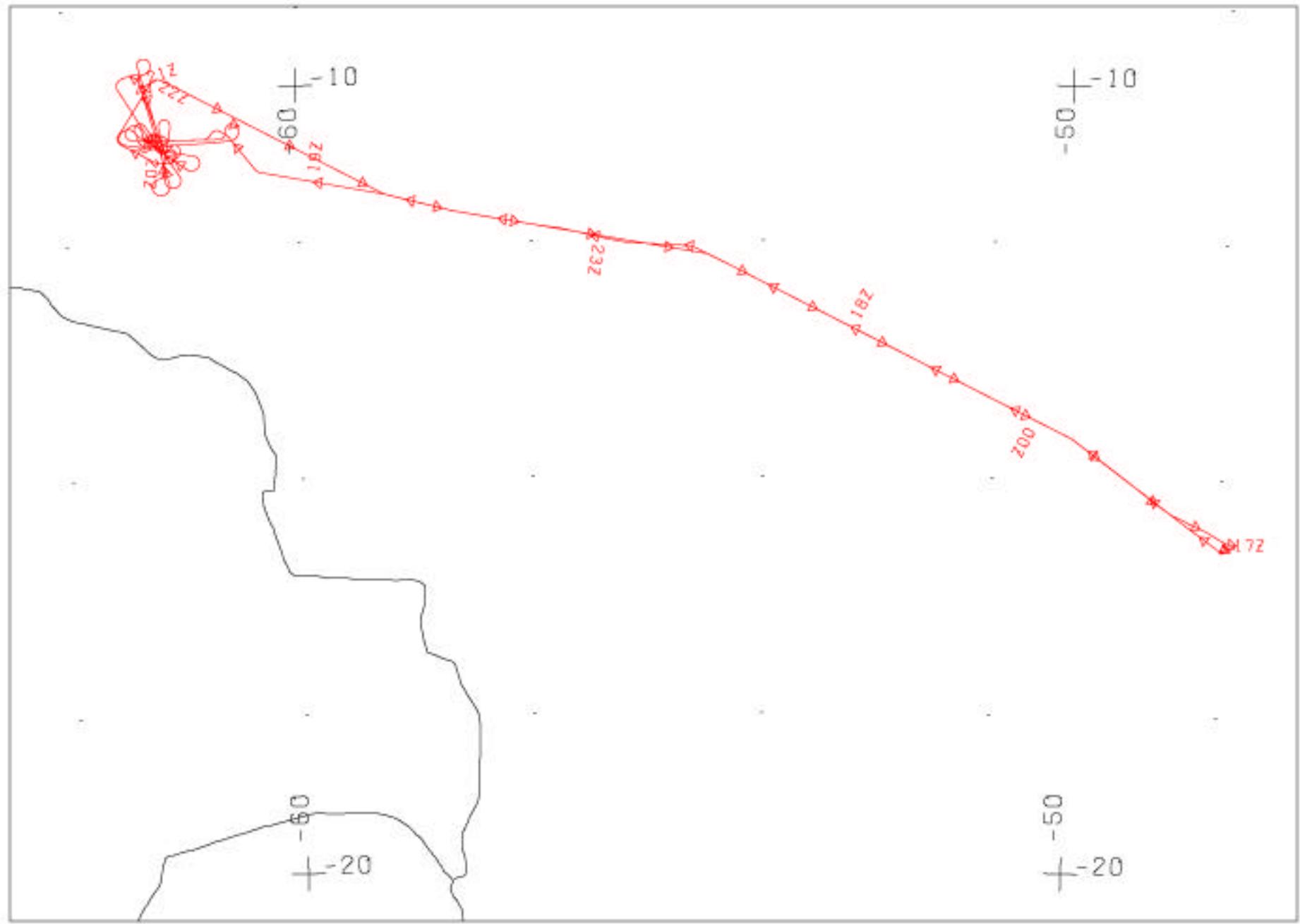
TRMM/BRAZIL

MASSD / VIS / EDDP / AMPR / MIR / LIP

MODIS AIRBORNE SIMULATOR (MAS) FLIGHT LINE INFORMATION FOR 26-JAN-1999 FLIGHT 99-032

START OF FLIGHT LINE							END OF FLIGHT LINE						
LINE	TIME	LAT	LON	SOLAR	START		TIME	LAT	LON	SOLAR	SCAN		
	HH:MM:SS	DEG	DEG	ZEN	AZIM	HEADING		HH:MM:SS	DEG	DEG	ZEN	AZIM	LINES
1	18:47:16	-11.559	-58.229	39.8	254.4	286.18	18:52:26	-11.405	-58.836	40.5	254.3	1932	
2	18:52:36	-11.400	-58.854	40.5	254.3	281.72	19:06:03	-11.098	-60.465	42.2	254.1	5033	
3	19:06:43	-11.060	-60.534	42.4	254.2	326.08	19:10:59	-10.666	-60.844	43.2	253.9	1586	
4	19:15:31	-10.666	-61.303	43.8	253.9	270.60	19:20:14	-10.666	-61.872	44.3	253.9	1766	
5	19:25:46	-10.662	-62.107	45.3	254.3	92.64	19:32:29	-10.669	-61.426	47.6	254.4	2514	
6	19:32:34	-10.667	-61.419	47.6	254.4	90.13	19:36:40	-10.667	-61.000	49.0	254.5	1540	
7	19:43:37	-10.701	-61.011	50.7	254.4	266.10	19:45:09	-10.713	-61.198	50.8	254.4	575	
8	19:45:19	-10.714	-61.218	50.9	254.4	267.85	19:51:03	-10.738	-61.917	51.6	254.4	2151	
9	19:57:13	-10.719	-62.176	52.7	254.7	97.60	19:59:31	-10.753	-61.945	53.4	254.7	861	
10	19:59:40	-10.754	-61.931	53.5	254.7	99.67	20:05:49	-10.873	-61.314	55.5	254.8	2301	
11	20:08:54	-11.036	-61.418	56.3	254.7	309.26	20:15:13	-10.603	-62.032	57.3	254.4	2363	
12	20:18:14	-10.509	-61.922	57.9	254.5	142.12	20:25:15	-11.125	-61.509	59.8	254.8	2625	
13	20:28:26	-11.180	-61.697	60.6	254.7	358.09	20:34:42	-10.489	-61.766	62.2	254.3	2350	
14	20:37:19	-10.505	-61.618	62.7	254.2	184.85	20:41:21	-10.954	-61.701	63.4	254.4	1509	
15	20:48:56	-11.166	-61.654	65.5	254.4	350.73	21:00:19	-9.933	-62.000	68.2	253.7	4259	
16	21:05:47	-9.748	-62.013	69.2	253.6	158.91	21:14:38	-10.664	-61.755	71.3	253.7	3317	
17	21:20:25	-10.834	-61.691	73.0	253.6	345.89	21:28:46	-9.939	-61.998	74.9	253.1	3124	
18	21:33:07	-10.067	-62.245	75.4	253.2	142.34	21:41:12	-10.789	-61.799	77.5	253.0	3025	
19	21:47:29	-10.929	-61.845	79.1	252.8	303.09	21:51:06	-10.719	-62.232	79.7	252.7	1354	
20	21:52:31	-10.591	-62.285	80.0	252.7	38.40	22:00:11	-9.934	-61.856	82.4	252.3	2869	
21	22:01:51	-9.903	-61.710	82.7	252.2	113.90	22:13:43	-10.483	-60.619	86.3	251.7	4439	
22	22:14:13	-10.508	-60.572	86.5	251.6	114.19	22:29:11	-11.237	-59.184	91.0	250.7	5562	
23	22:29:13	-11.240	-59.177	91.0	250.7	113.69	22:32:13	-11.384	-58.901	91.9	250.5	1024	
24	22:32:45	-11.403	-58.853	92.1	250.4	101.43	22:41:09	-11.610	-58.033	94.7	249.8	3142	
25	22:41:17	-11.615	-58.020	94.8	249.8	99.32	22:52:48	-11.814	-56.872	98.4	248.8	4308	

NUMBER OF FILES FOR THIS FLIGHT = 25
 TOTAL NUMBER OF SCAN LINES = 65529
 DATE THESE FILES WERE PROCESSED = 23-Feb-99
 DATE THIS LIST WAS CREATED = 24-Feb-99
 GRANULE VERSION = 9



FLIGHT 99-032

27-28 JANUARY 1999

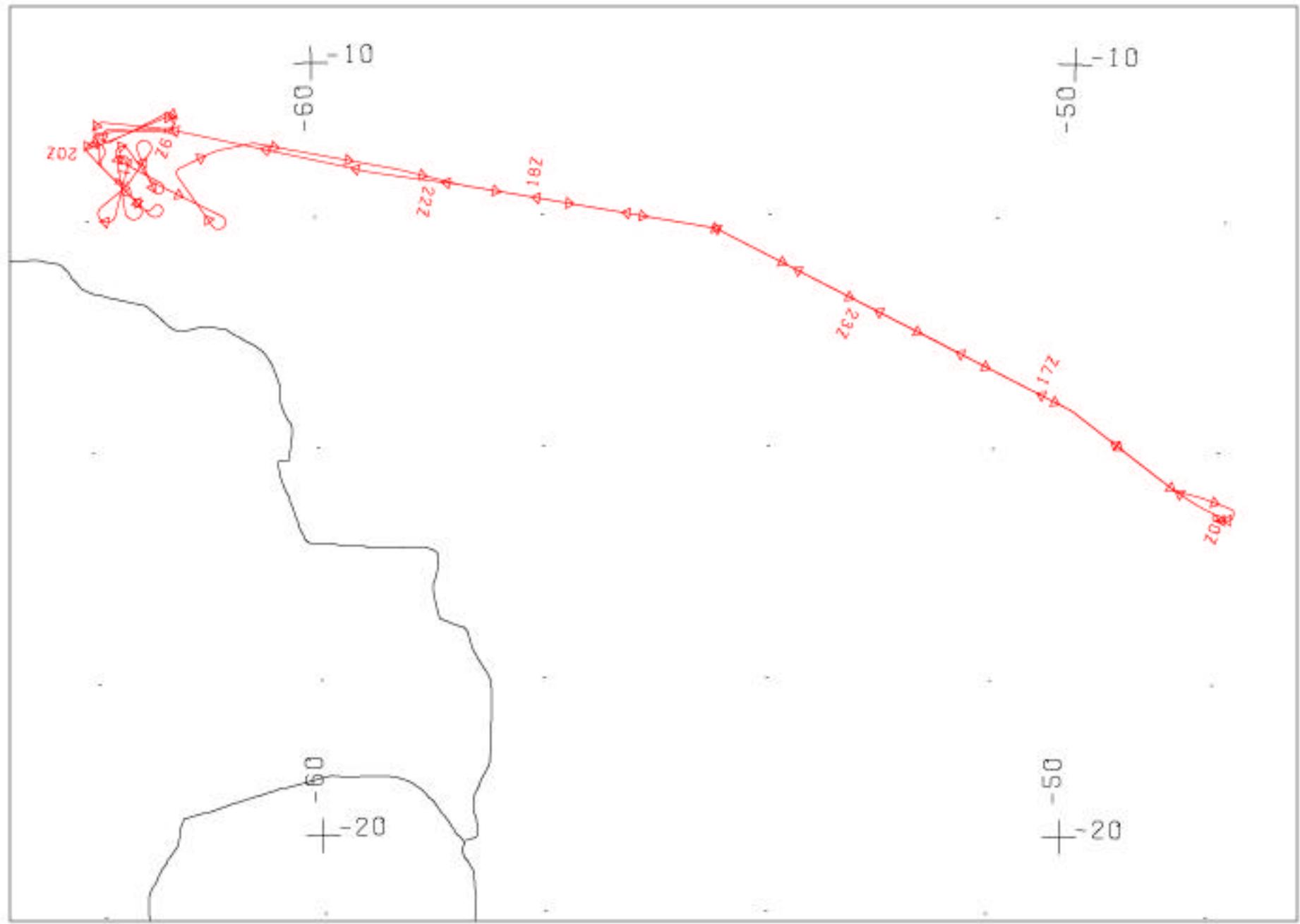
A/C 806

MASSO / VIS / EDDP / AMPR / MIR / LIP

MODIS AIRBORNE SIMULATOR (MAS) FLIGHT LINE INFORMATION FOR 30-JAN-1999 FLIGHT 99-033

START OF FLIGHT LINE							END OF FLIGHT LINE						
LINE	TIME	LAT	LON	SOLAR	START		TIME	LAT	LON	SOLAR	SCAN		
	HH:MM:SS	DEG	DEG	ZEN	AZIM	HEADING		HH:MM:SS	DEG	DEG	ZEN	AZIM	LINES
1	18:08:08	-11.609	-58.030	30.4	254.5	280.32	18:18:08	-11.434	-59.225	31.7	254.6	3735	
2	18:18:53	-11.413	-59.318	31.8	254.6	285.92	18:40:18	-10.834	-61.847	34.6	254.3	8010	
3	18:41:07	-10.819	-61.946	34.7	254.3	268.02	18:47:54	-10.848	-62.767	35.5	254.5	2538	
4	18:50:54	-10.995	-62.755	36.2	255.2	71.85	18:59:18	-10.678	-61.932	39.0	255.2	3143	
5	19:02:27	-10.862	-61.934	39.7	255.2	273.44	19:08:17	-10.809	-62.641	40.5	255.2	2183	
6	19:11:34	-10.942	-62.595	41.2	255.8	68.89	19:14:27	-10.818	-62.319	42.2	255.7	1079	
7	19:14:30	-10.816	-62.313	42.2	255.7	68.94	19:18:44	-10.627	-61.921	43.7	255.6	1584	
8	19:22:28	-10.814	-61.958	44.5	255.6	278.29	19:28:44	-10.717	-62.726	45.3	255.5	2345	
9	19:34:54	-11.292	-62.775	46.4	256.4	134.27	19:42:33	-11.843	-62.241	48.6	256.9	2862	
10	19:48:00	-11.910	-62.174	50.2	256.8	320.54	19:54:53	-11.309	-62.754	51.4	256.3	2575	
11	20:00:45	-11.128	-62.929	52.4	256.3	135.60	20:09:09	-11.736	-62.346	54.9	256.6	3142	
12	20:13:59	-11.845	-62.484	56.1	256.6	0.21	20:19:10	-11.257	-62.560	57.4	256.1	1939	
13	20:22:11	-11.289	-62.433	58.0	256.1	189.03	20:28:09	-11.929	-62.609	59.1	256.4	2232	
14	20:31:41	-11.824	-62.803	59.9	256.4	59.15	20:36:01	-11.549	-62.452	61.4	256.1	1622	
15	20:36:35	-11.503	-62.415	61.6	256.1	41.67	20:41:05	-11.121	-62.135	63.0	255.8	1684	
16	20:44:52	-11.120	-62.289	63.5	255.7	153.32	20:49:56	-11.611	-62.093	64.8	255.8	1901	
17	20:52:51	-11.499	-62.037	65.8	255.6	302.91	20:57:11	-11.234	-62.514	66.5	255.4	1626	
18	21:00:35	-11.075	-62.421	67.2	255.4	141.60	21:05:11	-11.469	-62.149	68.4	255.4	1726	
19	21:05:44	-11.506	-62.110	68.6	255.4	116.65	21:15:44	-11.964	-61.215	71.7	255.2	3740	
20	21:19:10	-12.046	-61.364	72.6	255.0	332.18	21:25:05	-11.460	-61.764	73.8	254.7	2213	
21	21:26:57	-11.313	-61.705	74.2	254.7	69.61	21:28:09	-11.263	-61.594	74.6	254.6	450	
22	21:28:12	-11.261	-61.589	74.6	254.6	69.67	21:30:35	-11.160	-61.367	75.4	254.5	898	
23	21:31:56	-11.113	-61.240	75.8	254.4	81.94	21:36:23	-11.032	-60.801	77.3	254.2	1625	
24	21:36:58	-11.034	-60.746	77.4	254.2	101.97	21:51:56	-11.318	-59.294	82.2	253.5	5598	

NUMBER OF FILES FOR THIS FLIGHT = 24
 TOTAL NUMBER OF SCAN LINES = 60450
 DATE THESE FILES WERE PROCESSED = 23-Feb-99
 DATE THIS LIST WAS CREATED = 23-Feb-99
 GRANULE VERSION = 9



FLIGHT 99-033

30-31 JANUARY 1999

A/C 806

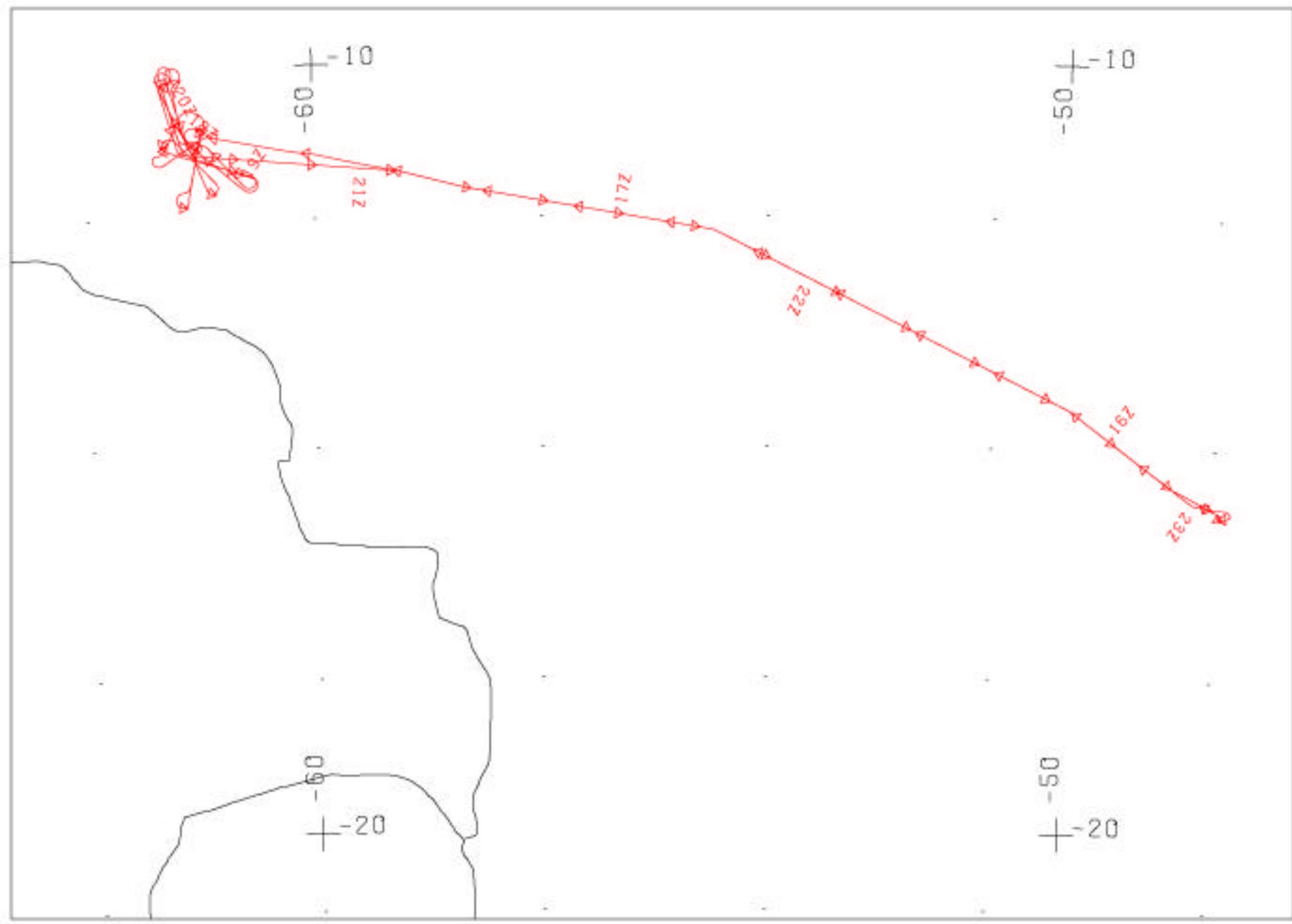
TRMM/BRAZIL

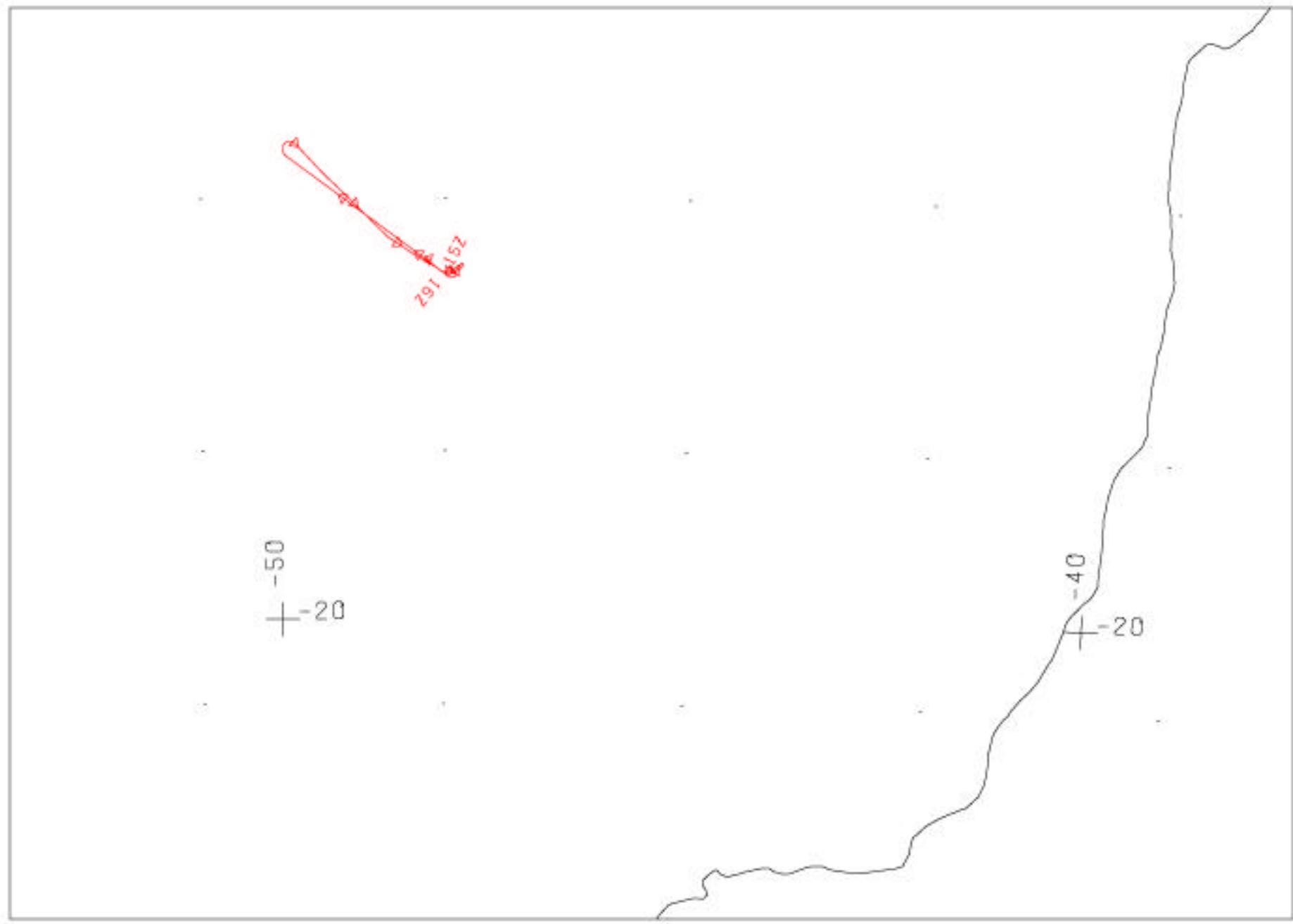
MAS50 / VIS / EDDP / AMPR / MIR / LIP

MODIS AIRBORNE SIMULATOR (MAS) FLIGHT LINE INFORMATION FOR 01-FEB-1999 FLIGHT 99-034

START OF FLIGHT LINE							END OF FLIGHT LINE						
LINE	TIME	LAT	LON	SOLAR	START		TIME	LAT	LON	SOLAR	SCAN		
	HH:MM:SS	DEG	DEG	ZEN	AZIM	HEADING	HH:MM:SS	DEG	DEG	ZEN	AZIM	LINES	
1	17:28:18	-11.320	-59.294	19.8	250.3	285.69	17:33:38	-11.179	-59.936	20.5	250.4	1993	
2	17:34:58	-11.164	-60.100	20.6	250.5	281.36	17:45:12	-10.931	-61.347	21.9	250.8	3827	
3	17:46:27	-10.970	-61.492	22.0	251.0	234.47	17:50:58	-11.277	-61.960	22.5	252.1	1690	
4	17:55:38	-11.026	-61.915	23.8	252.6	33.14	17:59:33	-10.663	-61.748	25.0	252.4	1465	
5	18:04:47	-10.850	-61.457	26.2	253.1	188.77	18:11:07	-11.561	-61.616	27.4	255.0	2373	
6	18:16:29	-11.716	-61.638	28.8	255.8	19.18	18:24:10	-10.923	-61.490	31.0	254.9	2873	
7	18:27:32	-10.967	-61.668	31.4	255.1	153.60	18:33:59	-11.612	-61.400	33.0	256.5	2413	
8	18:36:39	-11.522	-61.287	34.0	256.3	322.22	18:43:00	-10.980	-61.810	35.2	255.7	2380	
9	18:46:17	-11.126	-61.895	35.6	256.3	106.63	18:57:27	-11.449	-60.800	39.3	257.1	4175	
10	19:00:29	-11.542	-60.940	40.0	257.0	323.26	19:05:49	-11.073	-61.378	41.0	256.5	1995	
11	19:09:26	-11.233	-61.474	41.5	257.0	109.41	19:16:36	-11.470	-60.787	43.8	257.3	2680	
12	19:19:38	-11.624	-60.912	44.6	257.2	315.22	19:26:45	-11.057	-61.582	45.8	256.7	2661	
13	19:27:17	-11.009	-61.626	45.9	256.7	330.89	19:28:41	-10.869	-61.722	46.2	256.6	525	
14	19:29:28	-10.784	-61.754	46.4	256.6	358.36	19:33:32	-10.316	-61.834	47.4	256.2	1521	
15	19:38:58	-10.196	-61.909	48.3	256.2	158.27	19:41:59	-10.499	-61.819	49.1	256.4	1129	
16	19:42:02	-10.504	-61.818	49.1	256.4	159.31	19:46:05	-10.916	-61.697	50.1	256.8	1515	
17	19:53:42	-10.815	-61.767	52.1	256.6	341.44	19:58:01	-10.353	-61.988	53.1	256.3	1615	
18	20:04:14	-10.171	-62.002	54.3	256.2	158.89	20:10:19	-10.788	-61.822	55.8	256.6	2280	
19	20:10:24	-10.796	-61.819	55.8	256.6	158.59	20:11:41	-10.928	-61.781	56.1	256.7	481	
20	20:17:07	-11.089	-61.729	57.7	256.7	350.55	20:23:40	-10.354	-61.948	59.2	256.2	2439	
21	20:28:30	-10.203	-62.044	60.0	256.1	159.53	20:37:02	-11.081	-61.791	62.1	256.4	3181	
22	20:38:42	-11.163	-61.656	62.7	256.5	96.61	21:05:11	-11.397	-58.910	71.6	255.6	9838	
23	21:05:35	-11.401	-58.863	71.7	255.6	103.23	21:12:45	-11.581	-58.147	74.0	255.4	2680	

NUMBER OF FILES FOR THIS FLIGHT = 23
 TOTAL NUMBER OF SCAN LINES = 57729
 DATE THESE FILES WERE PROCESSED = 24-Feb-99
 DATE THIS LIST WAS CREATED = 24-Feb-99
 GRANULE VERSION = 9





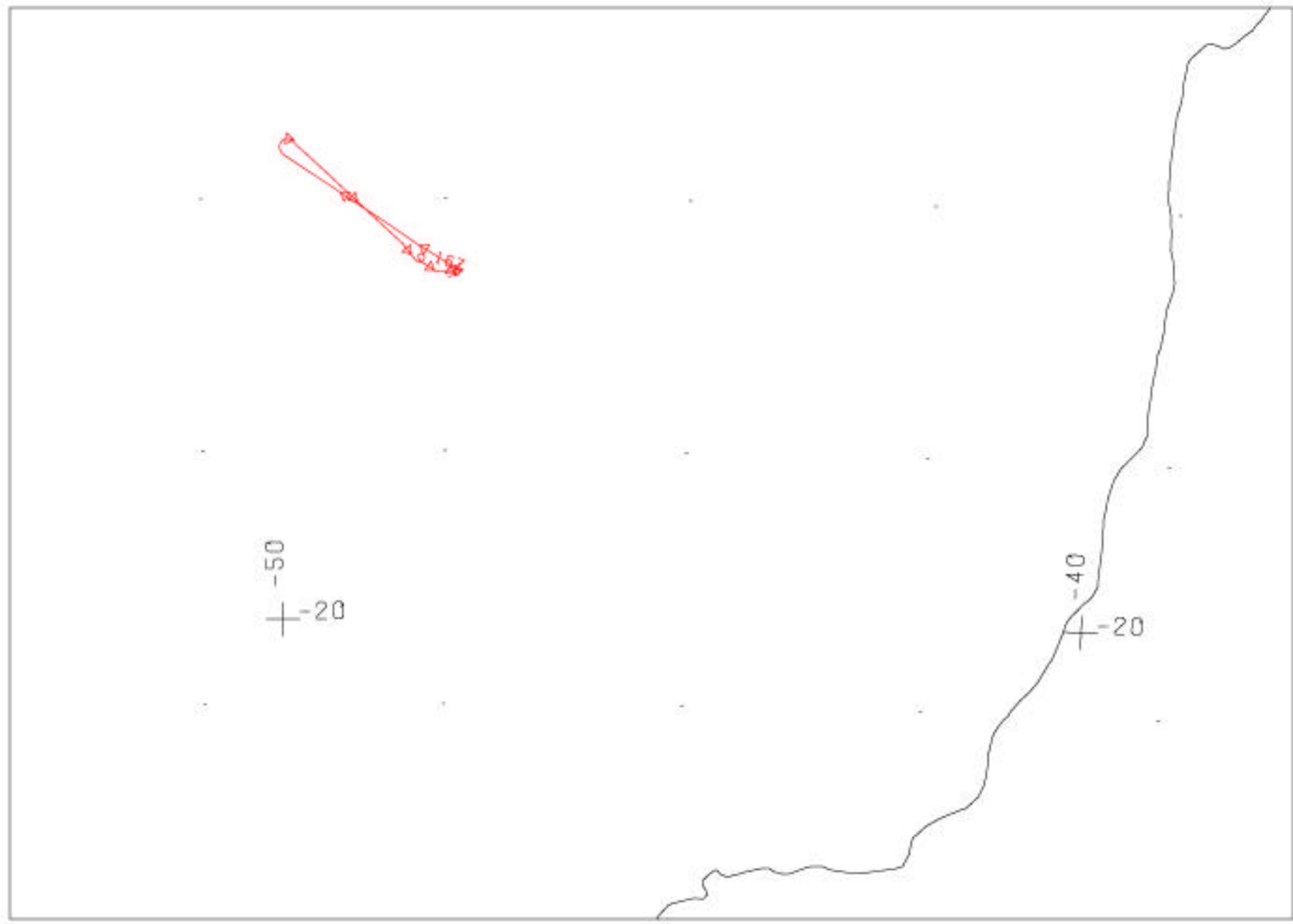
FLIGHT 99-035

3 FEBRUARY 1999

A/C 806

TRMM/BRAZIL

PILOT PRO



FLIGHT 99-036

4 FEBRUARY 1999

A/C 806

TRMM/BRAZIL

PILOT PRO

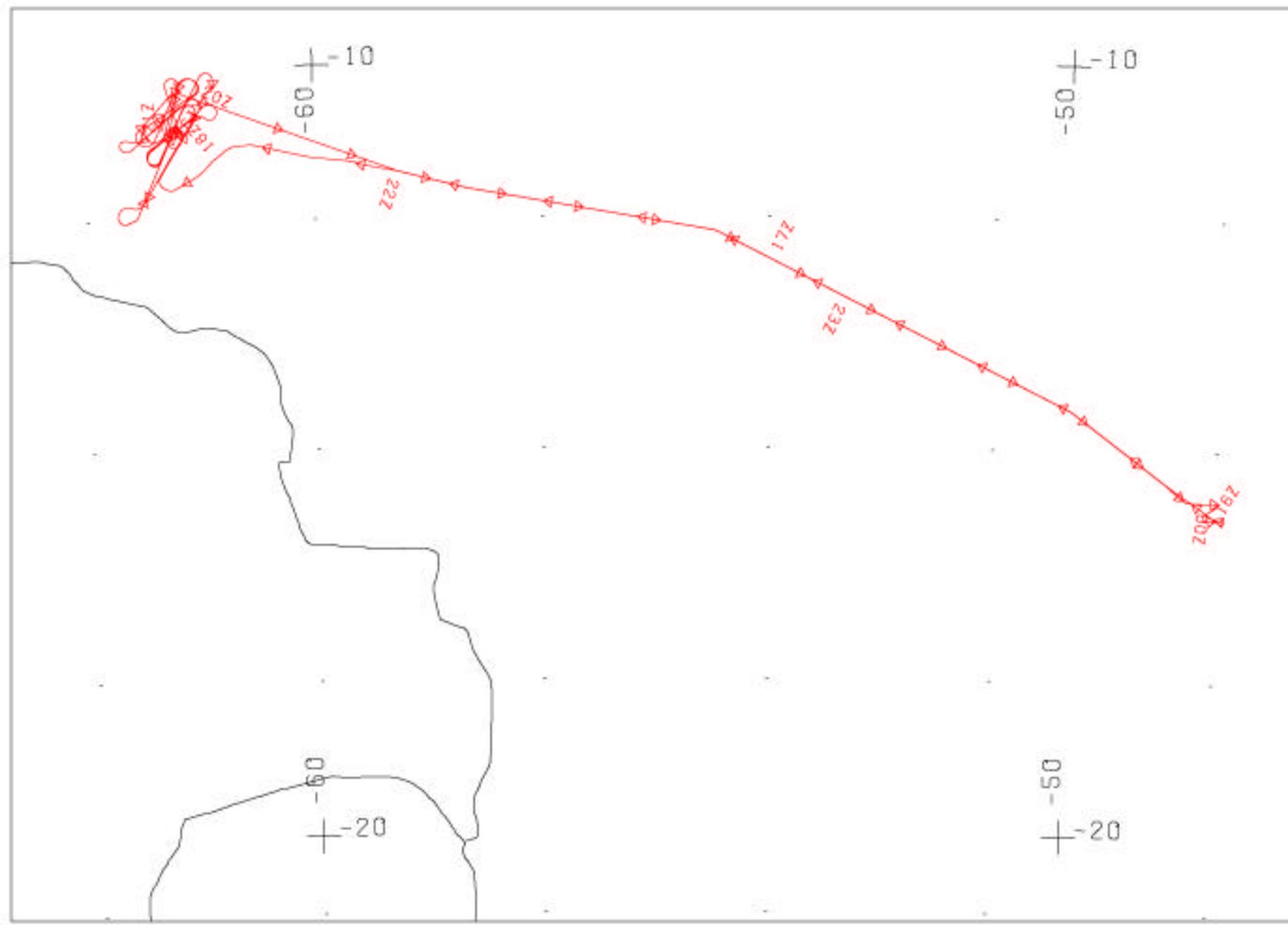
MODIS AIRBORNE SIMULATOR (MAS) FLIGHT LINE INFORMATION FOR 05-FEB-1999 FLIGHT 99-037

START OF FLIGHT LINE

END OF FLIGHT LINE

LINE	TIME HH:MM:SS	LAT			LON			SOLAR		START HEADING	TIME HH:MM:SS	LAT			LON			SOLAR		SCAN LINES
		DEG			DEG			ZEN	AZIM			DEG			DEG			ZEN	AZIM	
1	17:30:41	-11.681			-57.623			21.4	255.7	279.96	17:33:23	-11.622			-57.959			21.8	255.7	1008
2	17:33:32	-11.621			-57.979			21.8	255.7	285.67	17:40:33	-11.406			-58.831			22.7	255.6	2623
3	17:40:44	-11.399			-58.854			22.7	255.5	282.73	17:44:46	-11.305			-59.354			23.2	255.5	1509
4	17:45:58	-11.259			-59.500			23.4	255.5	277.49	17:49:54	-11.204			-59.998			23.9	255.5	1472
5	17:50:03	-11.204			-60.018			23.9	255.5	284.10	17:56:25	-11.031			-60.796			24.7	255.5	2381
6	17:56:49	-11.028			-60.844			24.7	255.4	264.33	17:58:24	-11.047			-61.039			24.9	255.6	593
7	17:59:30	-11.103			-61.161			24.9	255.8	229.21	18:01:11	-11.229			-61.324			25.2	256.1	630
8	18:03:50	-11.445			-61.563			25.5	256.7	237.39	18:06:10	-11.585			-61.814			25.8	257.0	873
9	18:08:55	-11.433			-62.025			26.4	257.3	37.64	18:17:30	-10.686			-61.551			29.1	256.5	3210
10	18:24:37	-10.640			-61.543			30.6	256.5	206.36	18:35:06	-11.705			-62.200			32.3	258.5	3920
11	18:42:50	-11.938			-62.319			34.2	259.3	29.64	18:58:24	-10.472			-61.668			38.9	257.6	5821
12	19:02:22	-10.647			-61.565			39.7	257.7	228.20	19:08:09	-11.080			-62.124			40.5	258.3	2163
13	19:12:01	-11.200			-61.994			41.7	258.6	29.12	19:18:47	-10.555			-61.713			43.7	258.0	2536
14	19:22:15	-10.687			-61.598			44.4	258.0	230.68	19:27:33	-11.068			-62.130			45.1	258.4	1988
15	19:31:04	-11.217			-62.013			46.2	258.7	30.15	19:38:06	-10.557			-61.706			48.3	258.1	2631
16	19:41:28	-10.691			-61.593			49.1	258.0	231.63	19:44:39	-10.911			-61.917			49.5	258.2	1191
17	19:44:42	-10.915			-61.922			49.5	258.2	232.13	19:46:48	-11.061			-62.135			49.8	258.3	786
18	19:50:28	-11.201			-62.010			50.9	258.6	31.24	19:57:15	-10.568			-61.709			52.9	258.0	2538
19	19:57:37	-10.532			-61.690			53.1	258.0	33.40	20:01:53	-10.133			-61.480			54.4	257.7	1597
20	20:09:49	-10.542			-61.778			55.7	257.8	224.89	20:16:22	-11.063			-62.383			56.6	258.1	2450
21	20:22:43	-10.868			-62.151			58.5	258.0	54.62	20:30:35	-10.358			-61.530			61.1	257.5	2943
22	20:35:04	-10.316			-61.765			61.8	257.4	187.49	20:40:33	-10.925			-61.910			62.8	257.6	2057
23	20:44:02	-10.916			-61.735			64.1	257.5	349.07	20:49:48	-10.275			-61.930			65.5	257.1	2163
24	20:53:15	-10.280			-61.765			66.2	257.0	191.27	20:58:34	-10.874			-61.952			67.1	257.2	1994
25	21:02:54	-10.742			-62.148			68.2	257.1	59.88	21:09:47	-10.359			-61.554			70.5	256.7	2575
26	21:13:41	-10.231			-61.763			71.1	256.5	198.75	21:15:25	-10.417			-61.849			71.4	256.6	648
27	21:15:44	-10.453			-61.863			71.4	256.6	198.18	21:20:11	-10.939			-62.076			72.2	256.6	1669
28	21:24:29	-10.778			-62.252			73.3	256.5	47.38	21:27:53	-10.519			-62.008			74.4	256.3	1272
29	21:27:56	-10.515			-62.005			74.4	256.3	47.28	21:29:51	-10.369			-61.867			75.0	256.2	717
30	21:31:23	-10.358			-61.723			75.4	256.1	108.03	21:46:31	-10.898			-60.257			80.2	255.5	5654
31	21:46:32	-10.898			-60.256			80.2	255.5	107.93	22:00:36	-11.387			-58.905			84.7	254.8	5257
32	22:00:50	-11.395			-58.881			84.8	254.8	103.56	22:02:46	-11.444			-58.689			85.4	254.7	728

NUMBER OF FILES FOR THIS FLIGHT = 32
 TOTAL NUMBER OF SCAN LINES = 69597
 DATE THESE FILES WERE PROCESSED = 11-Mar-99
 DATE THIS LIST WAS CREATED = 12-Mar-99
 GRANULE VERSION = 9



FLIGHT 99-037

5-6 FEBRUARY 1999

A/C 806

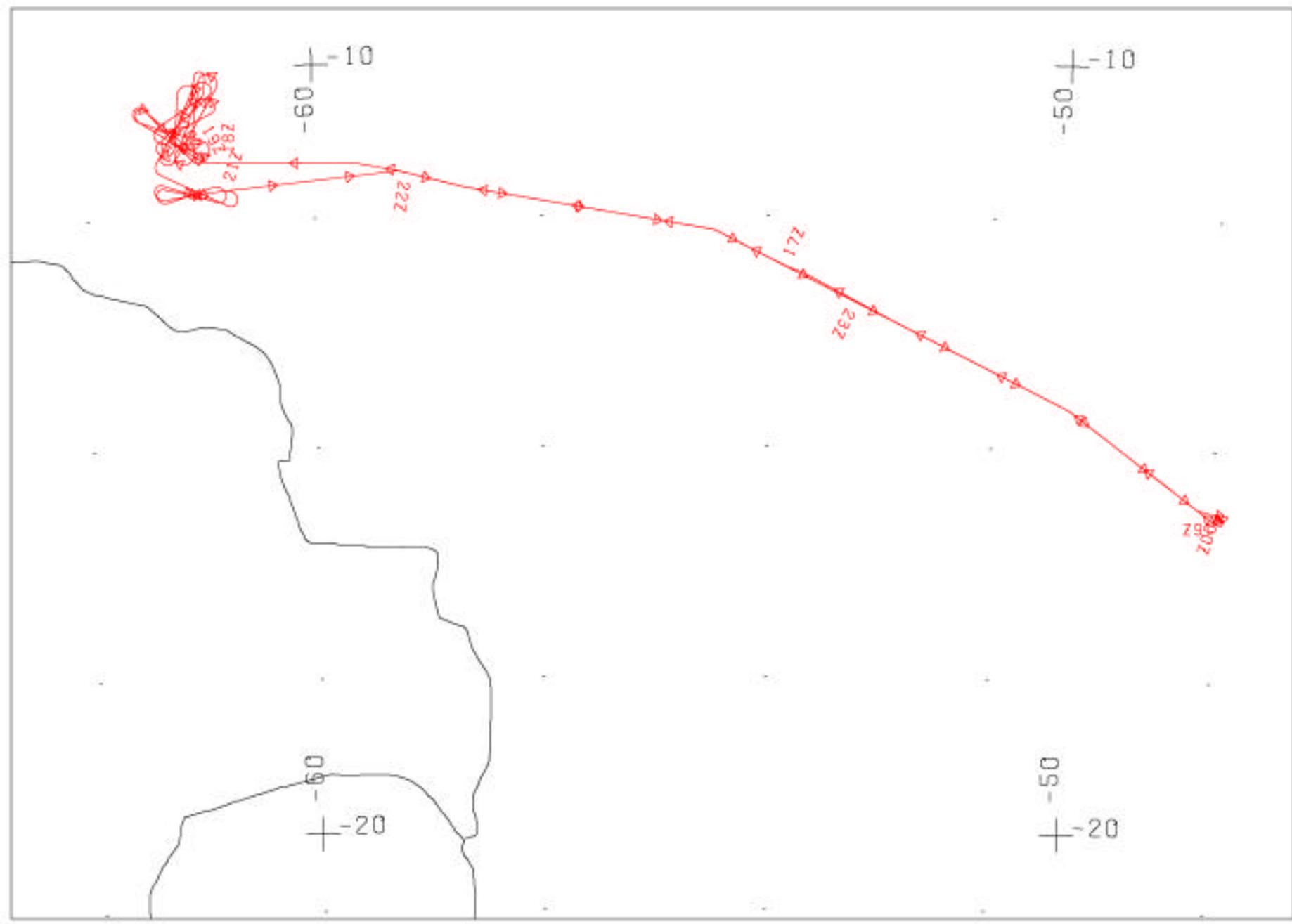
TRMM/BRAZIL

MASSD / VIS / EDDP / AMPR / MIR / LIP

MODIS AIRBORNE SIMULATOR (MAS) FLIGHT LINE INFORMATION FOR 07-FEB-1999 FLIGHT 99-038

START OF FLIGHT LINE							END OF FLIGHT LINE						
LINE	TIME	LAT	LON	SOLAR	START	TIME	LAT	LON	SOLAR	SCAN			
	HH:MM:SS	DEG	DEG	ZEN	AZIM	HEADING	HH:MM:SS	DEG	DEG	ZEN	AZIM	LINES	
1	21:21:33	-11.596	-61.385	73.1	257.3	250.82	21:25:57	-11.768	-61.919	73.7	257.3	1646	
2	21:29:39	-11.607	-61.918	74.5	257.2	98.63	21:32:50	-11.668	-61.600	75.6	257.0	1203	
3	21:33:18	-11.669	-61.558	75.8	257.0	82.87	21:37:09	-11.626	-61.176	77.1	256.8	1440	
4	21:37:13	-11.627	-61.168	77.1	256.8	83.46	21:59:23	-11.402	-58.906	84.6	255.5	8287	
5	22:00:02	-11.406	-58.841	84.7	255.5	102.64	22:07:53	-11.603	-58.057	87.3	255.0	2935	

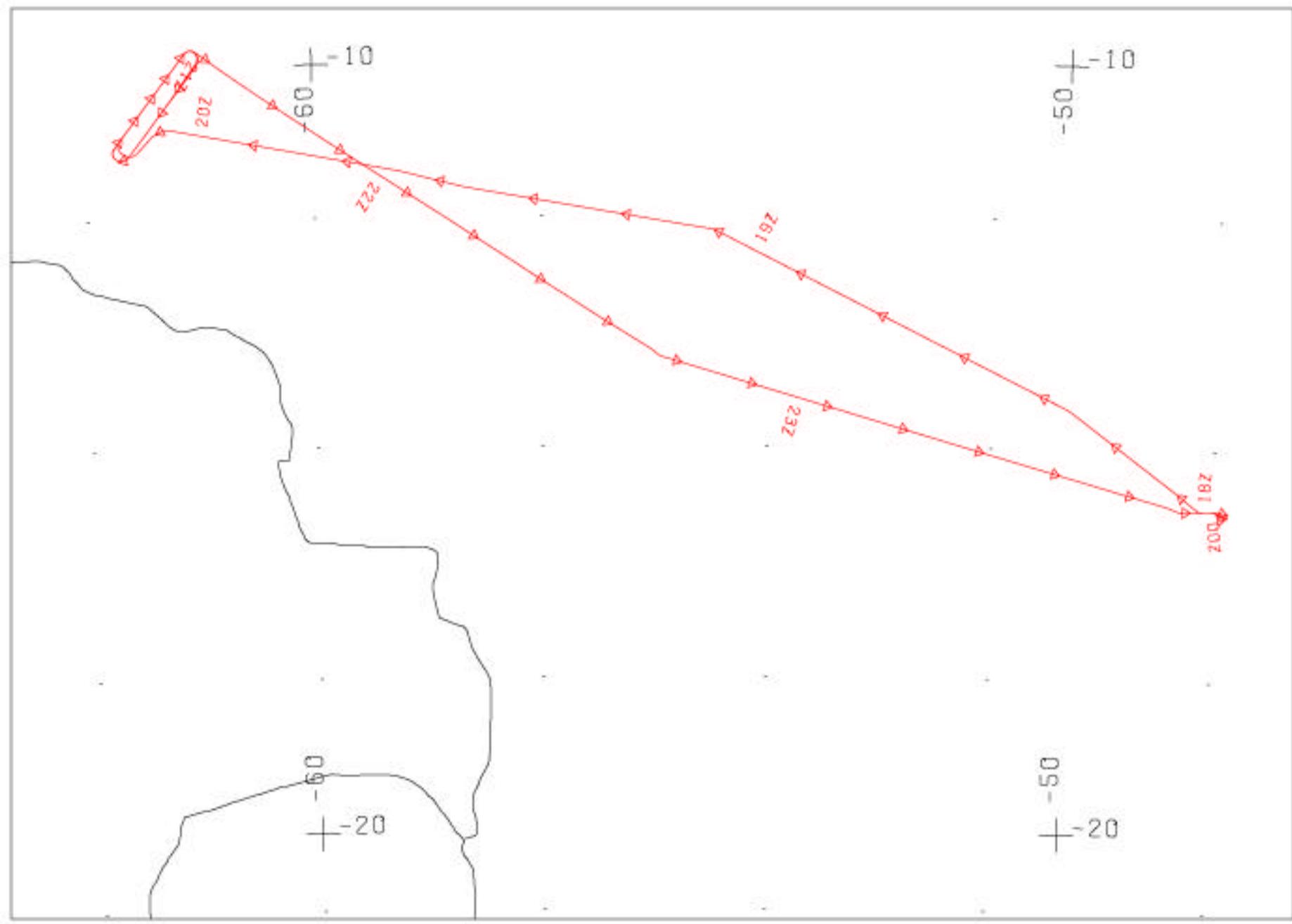
NUMBER OF FILES FOR THIS FLIGHT = 5
TOTAL NUMBER OF SCAN LINES = 15511
DATE THESE FILES WERE PROCESSED = 01-Mar-99
DATE THIS LIST WAS CREATED = 02-Mar-99
GRANULE VERSION = 9



MODIS AIRBORNE SIMULATOR (MAS) FLIGHT LINE INFORMATION FOR 08-FEB-1999 FLIGHT 99-039

START OF FLIGHT LINE							END OF FLIGHT LINE						
LINE	TIME	LAT	LON	SOLAR	START		TIME	LAT	LON	SOLAR	SCAN		
	HH:MM:SS	DEG	DEG	ZEN	AZIM	HEADING		HH:MM:SS	DEG	DEG	ZEN	AZIM	LINES
1	19:32:49	-11.600	-58.068	50.3	259.9	287.70		19:39:05	-11.406	-58.832	51.1	259.7	2342
2	19:39:16	-11.402	-58.853	51.1	259.7	283.25		20:03:53	-10.825	-61.891	54.2	259.1	9204
3	20:06:12	-10.937	-62.145	54.4	259.2	219.54		20:08:07	-11.107	-62.305	54.7	259.3	717
4	20:11:54	-10.924	-62.519	55.6	259.3	42.65		20:25:27	-9.828	-61.664	59.9	258.3	5066
5	20:28:40	-10.000	-61.519	60.6	258.3	213.70		20:39:38	-11.051	-62.336	62.2	258.7	4100
6	20:43:56	-11.030	-62.602	63.2	258.7	42.33		20:58:38	-9.831	-61.664	67.9	257.8	5495
7	21:01:59	-10.021	-61.550	68.6	257.7	212.73		21:13:59	-11.167	-62.423	70.4	257.9	4486
8	21:16:55	-11.050	-62.616	71.1	257.8	41.33		21:31:35	-9.827	-61.661	75.8	256.9	5488
9	21:33:02	-9.812	-61.535	76.1	256.9	122.82		21:46:31	-10.645	-60.355	80.3	256.5	5040
10	21:46:34	-10.644	-60.347	80.3	256.5	121.93		21:55:21	-11.161	-59.574	83.0	256.1	3284
11	21:55:22	-11.160	-59.571	83.0	256.1	121.42		22:04:05	-11.657	-58.806	85.7	255.6	3259

NUMBER OF FILES FOR THIS FLIGHT = 11
 TOTAL NUMBER OF SCAN LINES = 48481
 DATE THESE FILES WERE PROCESSED = 10-Mar-99
 DATE THIS LIST WAS CREATED = 10-Mar-99
 GRANULE VERSION = 9



FLIGHT 99-039

8-9 FEBRUARY 1999

A/C 806

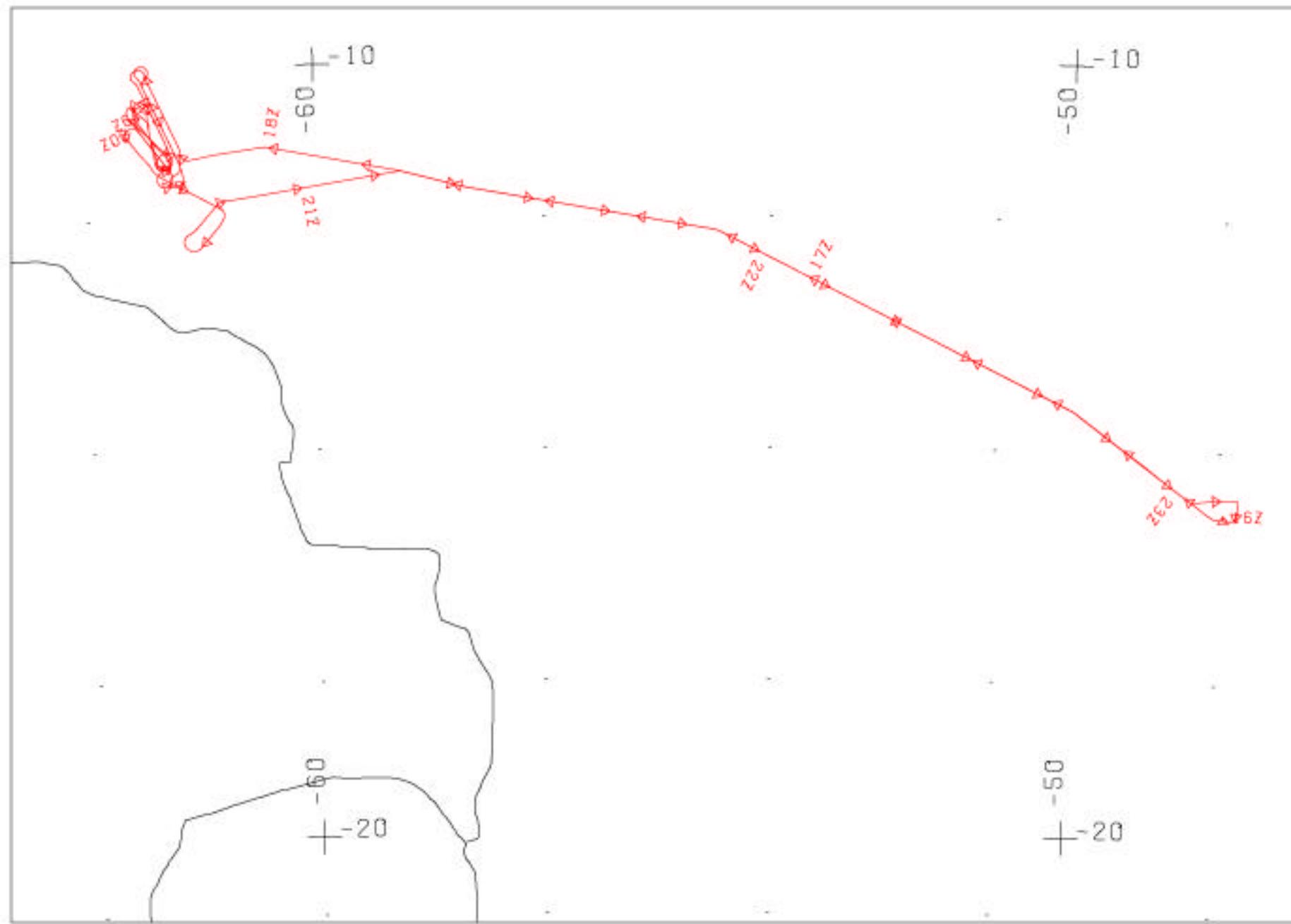
TRMM/BRAZIL

MASSD / VIS / EDDP / AMPR / MIR / LIP

MODIS AIRBORNE SIMULATOR (MAS) FLIGHT LINE INFORMATION FOR 10-FEB-1999 FLIGHT #99-040

START OF FLIGHT LINE							END OF FLIGHT LINE						
LINE	TIME	LAT	LON	SOLAR	START		TIME	LAT	LON	SOLAR	SCAN		
	HH:MM:SS	DEG	DEG	ZEN	AZIM	HEADING		HH:MM:SS	DEG	DEG	ZEN	AZIM	LINES
1	17:59:14	-11.100	-60.449	25.4	259.6	283.45	18:00:37	-11.068	-60.617	25.6	259.5	516	
2	18:01:08	-11.068	-60.681	25.6	259.5	262.47	18:06:15	-11.154	-61.309	26.2	259.8	1914	
3	18:11:02	-11.071	-61.766	27.1	260.0	341.33	18:19:33	-10.200	-62.167	28.9	258.6	3185	
4	18:25:16	-10.272	-62.229	30.0	259.1	150.85	18:35:31	-11.263	-61.771	32.7	261.0	3834	
5	18:43:37	-11.153	-61.823	34.9	260.8	341.40	18:52:08	-10.275	-62.226	36.7	259.7	3191	
6	18:57:34	-10.243	-62.295	37.7	259.8	150.44	19:05:27	-10.998	-61.949	39.8	260.8	2954	
7	19:12:52	-11.049	-61.925	41.9	260.7	341.76	19:17:56	-10.526	-62.167	43.0	260.1	1895	
8	19:20:48	-10.594	-62.306	43.3	260.4	129.79	19:22:24	-10.709	-62.184	43.8	260.5	605	
9	19:23:52	-10.856	-62.157	44.1	260.6	163.75	19:27:39	-11.263	-62.083	45.0	260.9	1416	
10	19:31:19	-11.163	-61.944	46.3	260.7	320.72	19:32:32	-11.061	-62.045	46.5	260.6	456	
11	19:33:14	-11.000	-62.101	46.7	260.5	329.22	19:36:46	-10.670	-62.343	47.3	260.2	1328	
12	19:42:40	-10.886	-62.152	48.7	260.4	160.15	19:46:11	-11.259	-62.054	49.5	260.7	1316	
13	19:51:24	-11.022	-62.061	51.1	260.3	320.16	19:55:41	-10.664	-62.417	51.8	260.0	1602	
14	20:00:50	-10.826	-62.302	52.9	260.2	139.63	20:05:29	-11.223	-62.000	54.3	260.4	1739	
15	19:12:52	-11.049	-61.925	41.9	260.7	341.76	19:17:56	-10.526	-62.167	43.0	260.1	1895	
16	19:20:48	-10.594	-62.306	43.3	260.4	129.79	19:22:24	-10.709	-62.184	43.8	260.5	605	
17	19:23:52	-10.856	-62.157	44.1	260.6	163.75	19:27:39	-11.263	-62.083	45.0	260.9	1416	
18	19:31:19	-11.163	-61.944	46.3	260.7	320.72	19:32:32	-11.061	-62.045	46.5	260.6	456	
19	19:33:14	-11.000	-62.101	46.7	260.5	329.22	19:36:46	-10.670	-62.343	47.3	260.2	1328	
20	19:42:40	-10.886	-62.152	48.7	260.4	160.15	19:46:11	-11.259	-62.054	49.5	260.7	1316	
21	19:51:24	-11.022	-62.061	51.1	260.3	320.16	19:55:41	-10.664	-62.417	51.8	260.0	1602	
22	20:00:50	-10.826	-62.302	52.9	260.2	139.63	20:05:29	-11.223	-62.000	54.3	260.4	1739	

NUMBER OF FILES FOR THIS FLIGHT = 22
 TOTAL NUMBER OF SCAN LINES = 36308
 DATE THESE FILES WERE PROCESSED = 03-Mar-99
 DATE THIS LIST WAS CREATED = 03-Mar-99
 GRANULE VERSION = 9



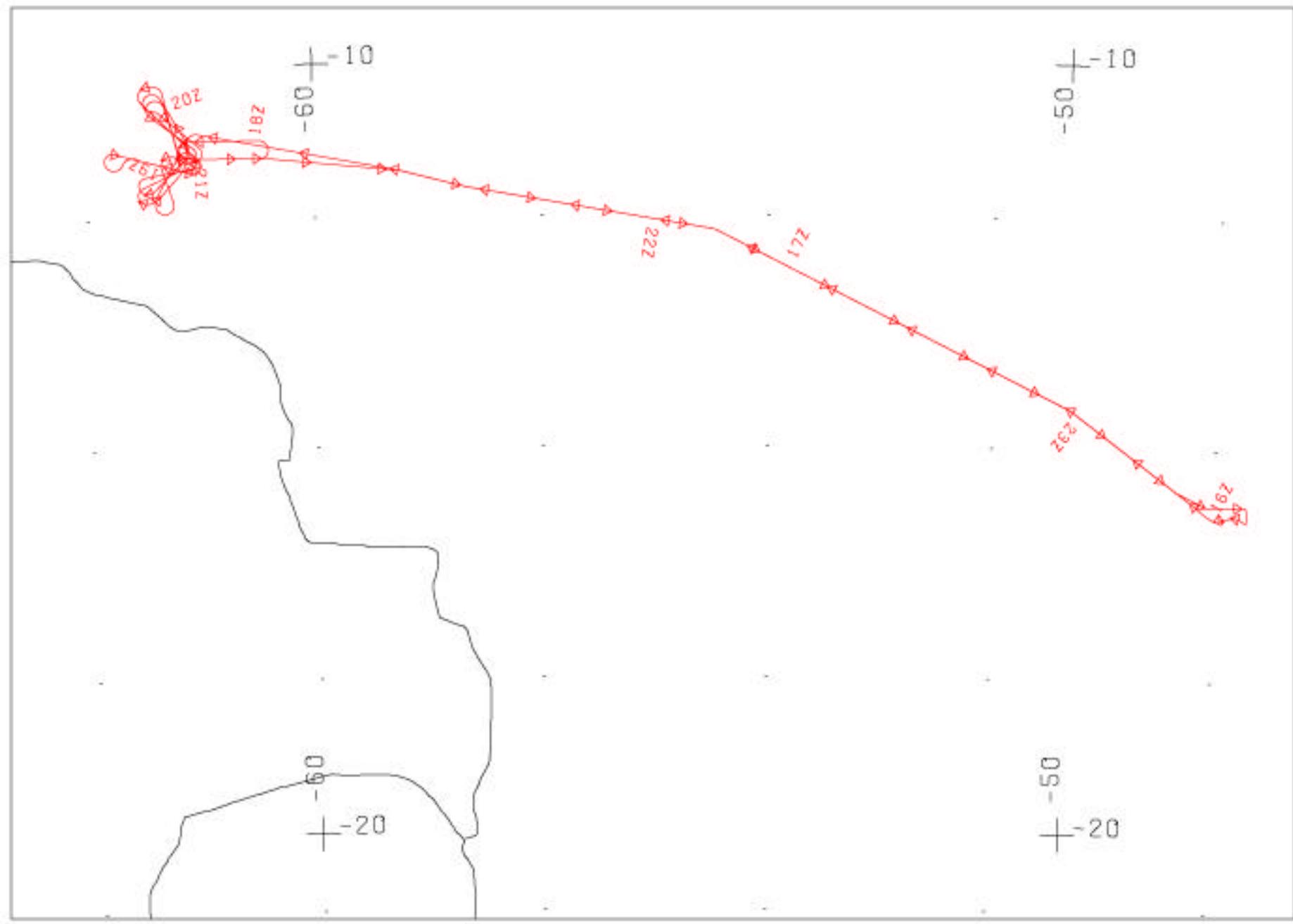
FLIGHT 99-040

10 FEBRUARY 1999

A/C 806

TRMM/BRAZIL

MASSD / VIS / EDDP / AMPR / MIR / LIP



FLIGHT 99-041

12 FEBRUARY 1999

A/C 806

TRMM/BRAZIL

MASSD / VIS / EDDP / AMPR / MIR / LIP

MODIS AIRBORNE SIMULATOR (MAS) FLIGHT LINE INFORMATION FOR 14-FEB-1999 FLIGHT 99-042

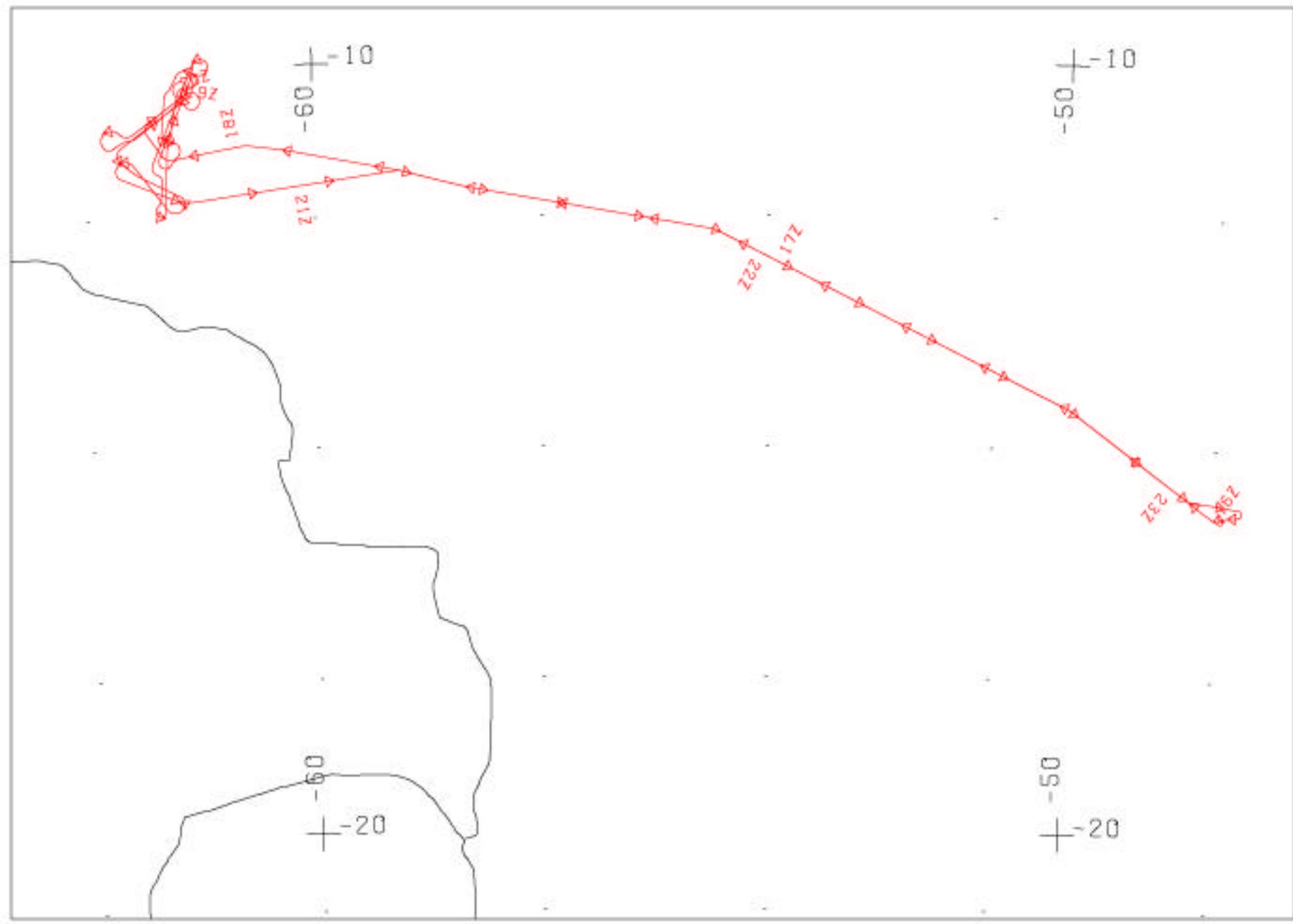
START OF FLIGHT LINE							END OF FLIGHT LINE						
LINE	TIME	LAT	LON	SOLAR	START		TIME	LAT	LON	SOLAR	SCAN		
	HH:MM:SS	DEG	DEG	ZEN	AZIM	HEADING		HH:MM:SS	DEG	DEG	ZEN	AZIM	LINES
1	17:37:32	-11.612	-58.014	22.4	263.6	285.41	17:44:27	-11.405	-58.834	23.3	263.2	2587	
2	17:44:37	-11.399	-58.853	23.3	263.1	281.53	17:50:47	-11.260	-59.598	24.1	262.9	2312	
3	17:51:50	-11.279	-59.722	24.1	263.0	250.80	18:01:21	-11.612	-60.828	25.3	263.7	3559	
4	18:03:51	-11.551	-61.121	25.8	263.7	310.90	18:07:42	-11.272	-61.487	26.4	263.1	1441	
5	18:12:14	-11.218	-61.640	27.2	263.5	122.46	18:14:00	-11.325	-61.490	27.8	263.7	662	
6	18:14:10	-11.336	-61.476	27.8	263.7	125.33	18:20:15	-11.719	-60.982	29.7	264.4	2275	
7	18:28:20	-11.660	-61.122	31.8	263.9	312.53	18:32:24	-11.374	-61.510	32.4	263.4	1526	
8	18:35:20	-11.487	-61.592	32.9	263.9	95.81	18:37:08	-11.507	-61.408	33.5	263.9	679	
9	18:44:23	-11.235	-61.282	35.6	263.1	310.76	18:47:46	-10.990	-61.606	36.1	262.8	1265	
10	18:49:20	-10.829	-61.680	36.5	262.7	2.83	18:55:07	-10.195	-61.684	38.0	261.9	2163	
11	18:59:45	-10.054	-61.767	38.7	261.7	174.81	19:07:38	-10.930	-61.767	40.5	262.7	2953	
12	19:15:31	-10.844	-61.786	42.7	262.5	5.94	19:17:33	-10.619	-61.781	43.3	262.2	761	
13	19:17:40	-10.606	-61.780	43.3	262.2	4.35	19:21:15	-10.213	-61.784	44.2	261.8	1340	
14	19:28:59	-10.267	-61.710	45.9	261.7	193.73	19:34:44	-10.884	-61.933	47.0	262.2	2150	
15	19:41:24	-11.058	-62.007	48.8	262.4	30.73	19:44:49	-10.721	-61.871	49.8	262.0	1278	
16	19:45:35	-10.637	-61.869	50.0	261.8	351.10	19:47:06	-10.470	-61.911	50.4	261.7	568	
17	19:48:11	-10.357	-61.893	50.6	261.6	25.05	19:50:03	-10.169	-61.825	51.2	261.5	698	
18	19:58:26	-10.229	-61.855	52.9	261.3	193.46	20:03:58	-10.823	-62.063	54.0	261.7	2069	
19	20:11:37	-10.838	-62.191	56.0	261.6	24.52	20:17:26	-10.245	-61.978	57.7	261.0	2175	
20	20:23:15	-10.424	-62.074	58.7	261.0	182.94	20:26:54	-10.819	-62.149	59.5	261.2	1371	
21	20:33:33	-10.994	-62.185	61.3	261.1	17.60	20:38:49	-10.425	-62.070	62.8	260.7	1969	
22	20:41:37	-10.191	-62.245	63.2	260.4	265.25	20:43:25	-10.218	-62.463	63.4	260.4	673	
23	20:47:12	-10.391	-62.390	64.4	260.5	57.74	20:49:03	-10.282	-62.232	65.0	260.4	692	
24	20:49:09	-10.276	-62.223	65.1	260.4	61.22	20:54:11	-9.999	-61.781	66.8	260.1	1888	
25	20:55:24	-10.000	-61.666	67.0	260.1	114.82	20:58:08	-10.127	-61.418	67.9	260.0	1023	
26	20:58:11	-10.128	-61.416	67.9	260.0	115.39	21:07:48	-10.566	-60.546	71.0	259.8	3551	
27	21:07:49	-10.569	-60.540	71.0	259.8	113.99	21:17:20	-11.007	-59.664	74.1	259.5	3557	

NUMBER OF FILES FOR THIS FLIGHT = 27
 TOTAL NUMBER OF SCAN LINES = 47185
 DATE THESE FILES WERE PROCESSED = 25-Mar-99
 DATE THIS LIST WAS CREATED = 26-Mar-99
 GRANULE VERSION = 9

MODIS AIRBORNE SIMULATOR (MAS) FLIGHT LINE INFORMATION FOR 17-FEB-1999 FLIGHT 99-043

START OF FLIGHT LINE							END OF FLIGHT LINE						
LINE	TIME	LAT	LON	SOLAR	START		TIME	LAT	LON	SOLAR	SCAN		
	HH:MM:SS	DEG	DEG	ZEN	AZIM	HEADING	HH:MM:SS	DEG	DEG	ZEN	AZIM	LINES	
1	20:37:37	-11.474	-62.501	61.8	262.5	109.04	20:45:21	-11.773	-61.750	64.4	262.3	2892	
2	20:45:50	-11.781	-61.701	64.6	262.3	83.50	20:47:19	-11.770	-61.547	65.1	262.2	555	
3	20:47:33	-11.769	-61.523	65.2	262.2	80.38	21:13:10	-11.404	-58.908	74.0	260.7	9577	
4	21:13:50	-11.406	-58.840	74.2	260.7	101.67	21:18:07	-11.516	-58.409	75.6	260.5	1607	

NUMBER OF FILES FOR THIS FLIGHT = 4
 TOTAL NUMBER OF SCAN LINES = 14631
 DATE THESE FILES WERE PROCESSED = 01-Mar-99
 DATE THIS LIST WAS CREATED = 02-Mar-99
 GRANULE VERSION = 9



FLIGHT 99-043

17 FEBRUARY 1999

A/C 806

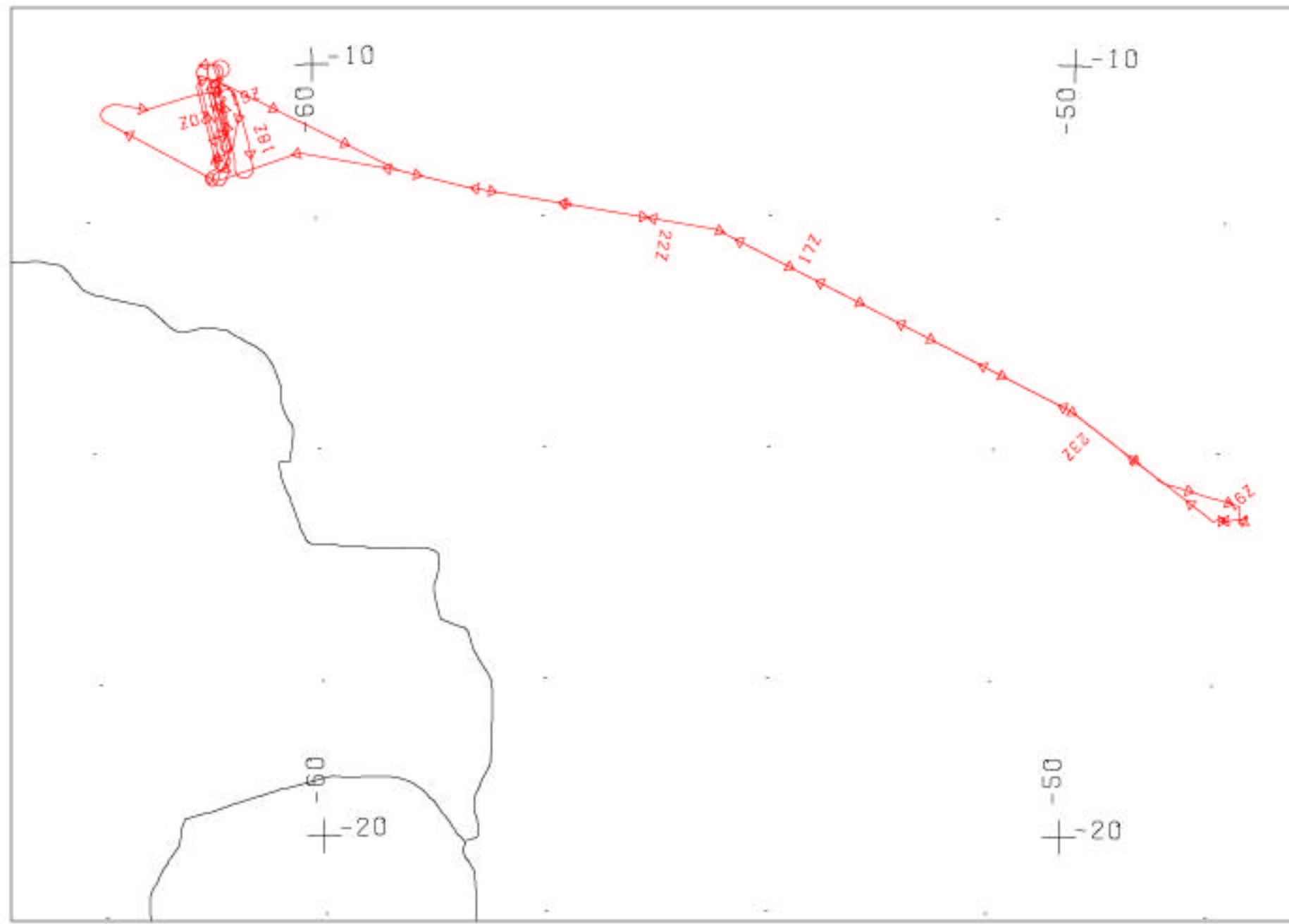
TRMM/BRAZIL

MASSD / VIS / EDDP / AMPR / MIR / LIP

MODIS AIRBORNE SIMULATOR (MAS) FLIGHT LINE INFORMATION FOR 21-FEB-1999 FLIGHT 99-044

START OF FLIGHT LINE							END OF FLIGHT LINE						
LINE	TIME	LAT	LON	SOLAR	START		TIME	LAT	LON	SOLAR	SCAN		
	HH:MM:SS	DEG	DEG	ZEN	AZIM	HEADING		HH:MM:SS	DEG	DEG	ZEN	AZIM	LINES
1	17:39:16	-11.608	-58.035	22.9	269.9	286.73		17:46:14	-11.406	-58.836	23.9	269.3	2603
2	17:46:23	-11.401	-58.849	23.9	269.3	283.10		17:57:15	-11.159	-60.143	25.3	268.6	4063
3	17:58:09	-11.172	-60.254	25.3	268.6	250.81		18:06:28	-11.481	-61.221	26.4	269.1	3115
4	18:07:40	-11.459	-61.358	26.7	269.0	302.59		18:20:41	-10.700	-62.718	28.6	267.3	4867
5	18:24:43	-10.475	-62.540	29.6	267.3	97.62		18:27:57	-10.542	-62.216	30.7	267.3	1210
6	18:28:45	-10.537	-62.136	31.1	267.2	76.24		18:34:04	-10.391	-61.615	32.9	266.8	1988
7	18:34:20	-10.384	-61.589	33.0	266.8	83.15		18:38:56	-10.314	-61.127	34.5	266.5	1721
8	18:40:37	-10.412	-61.006	34.9	266.5	160.38		18:46:01	-10.968	-60.860	36.4	267.1	2020
9	18:46:16	-10.994	-60.853	36.4	267.1	165.68		18:49:29	-11.335	-60.800	37.2	267.5	1203
10	18:54:25	-11.175	-61.045	38.5	267.0	352.42		19:01:39	-10.366	-61.227	40.1	265.9	2706
11	19:05:30	-10.452	-60.997	41.0	265.9	162.97		19:06:51	-10.592	-60.967	41.4	266.0	506
12	19:07:30	-10.660	-60.971	41.5	266.0	188.02		19:11:00	-11.040	-61.052	42.3	266.4	1315
13	19:16:16	-10.723	-61.120	43.8	265.9	354.83		19:20:20	-10.264	-61.218	44.7	265.3	1522
14	19:26:47	-10.119	-61.250	46.0	265.1	168.02		19:31:50	-10.648	-61.187	47.3	265.4	1889
15	19:32:16	-10.693	-61.179	47.4	265.5	161.23		19:35:32	-11.032	-61.101	48.2	265.7	1222
16	19:40:39	-11.291	-61.154	49.7	265.7	24.62		19:42:17	-11.122	-61.097	50.2	265.5	612
17	19:43:13	-11.022	-61.107	50.4	265.3	346.75		19:49:43	-10.302	-61.318	51.8	264.6	2431
18	19:55:40	-10.114	-61.363	53.0	264.4	162.58		20:06:18	-11.208	-61.104	55.7	264.8	3976
19	20:14:02	-11.274	-61.139	57.9	264.5	353.17		20:22:34	-10.325	-61.365	59.8	263.7	3191
20	20:29:49	-10.173	-61.486	61.2	263.5	161.97		20:39:48	-11.214	-61.239	63.8	263.7	3733
21	20:46:52	-11.291	-61.272	65.8	263.4	351.74		20:56:00	-10.299	-61.507	67.9	262.7	3416
22	20:59:52	-10.214	-61.217	68.9	262.6	114.21		21:24:48	-11.382	-58.908	77.0	261.7	9189
23	21:25:19	-11.402	-58.857	77.2	261.7	103.12		21:31:00	-11.545	-58.291	79.1	261.4	2126

NUMBER OF FILES FOR THIS FLIGHT = 23
 TOTAL NUMBER OF SCAN LINES = 60624
 DATE THESE FILES WERE PROCESSED = 11-Mar-99
 DATE THIS LIST WAS CREATED = 11-Mar-99
 GRANULE VERSION = 9



FLIGHT 99-044

21 FEBRUARY 1999

R/C 806

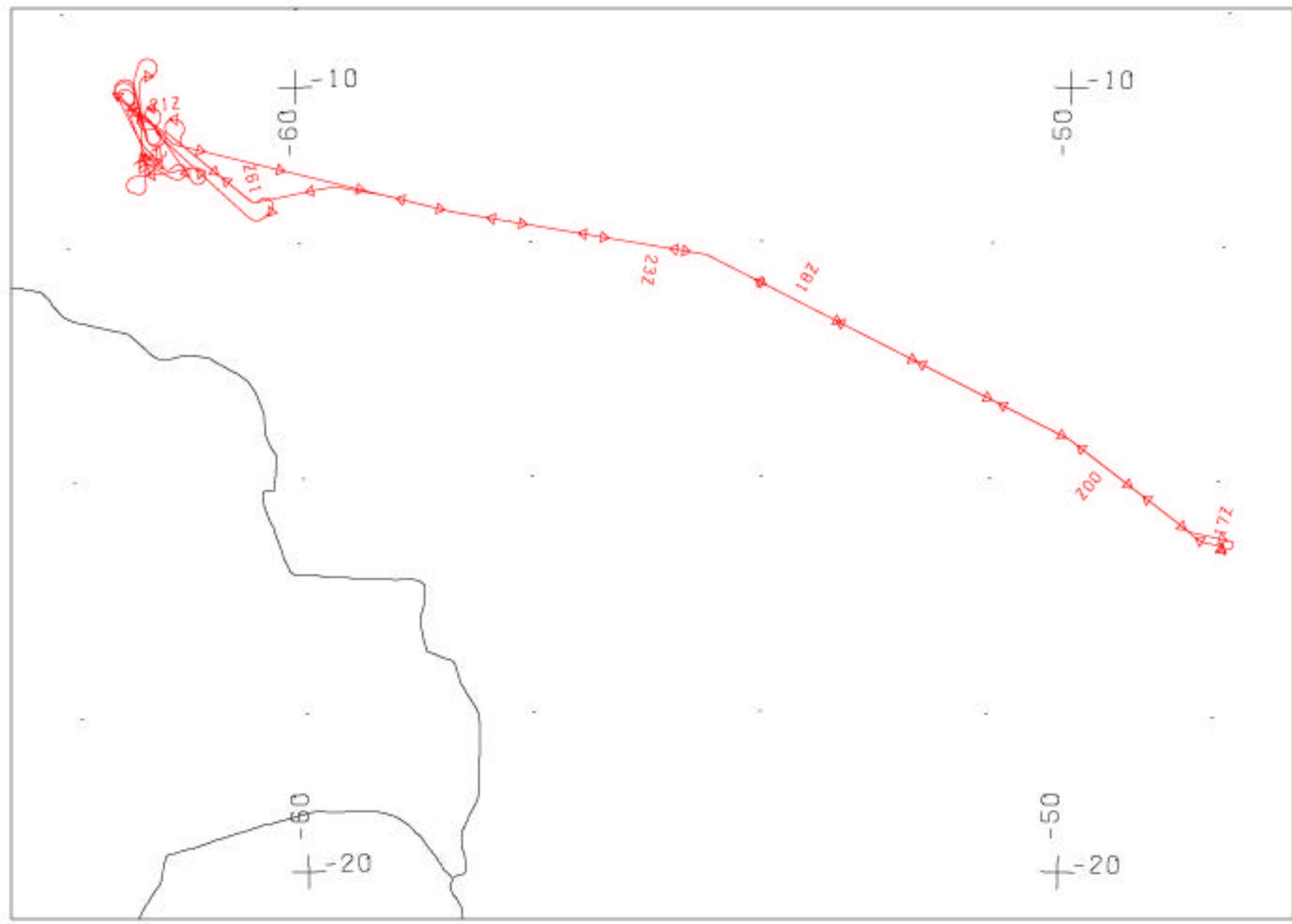
TRMM/BRAZIL

MASSD / VIS / EDDP / AMPR / MIR / LIP

MODIS AIRBORNE SIMULATOR (MAS) FLIGHT LINE INFORMATION FOR 23-FEB-1999 FLIGHT 99-045

START OF FLIGHT LINE								END OF FLIGHT LINE							
LINE	TIME	LAT	LON	SOLAR	START	TIME	LAT	LON	SOLAR	SCAN					
	HH:MM:SS	DEG	DEG	ZEN	AZIM	HEADING	HH:MM:SS	DEG	DEG	ZEN	AZIM	LINES			
1	18:39:26	-11.612	-58.019	37.8	268.7	284.85	18:46:25	-11.406	-58.836	38.7	268.3	2609			
2	18:46:35	-11.400	-58.853	38.7	268.3	281.86	18:51:46	-11.286	-59.467	39.4	268.0	1939			
3	18:52:27	-11.285	-59.549	39.4	268.0	260.95	18:53:55	-11.310	-59.722	39.6	268.0	549			
4	18:54:05	-11.314	-59.741	39.6	268.0	257.94	19:00:39	-11.458	-60.516	40.5	268.1	2455			
5	19:01:39	-11.424	-60.626	40.8	268.0	312.65	19:10:50	-10.727	-61.458	42.2	267.0	3434			
6	19:17:34	-10.577	-61.637	43.5	266.9	128.36	19:30:23	-11.435	-60.617	47.6	267.2	4803			
7	19:37:48	-11.632	-60.657	49.6	266.9	317.00	19:46:14	-10.951	-61.380	51.0	266.1	3159			
8	19:46:18	-10.948	-61.383	51.0	266.1	317.16	19:50:46	-10.584	-61.768	51.7	265.7	1670			
9	19:57:10	-10.409	-61.864	53.0	265.6	142.92	20:05:54	-11.172	-61.358	55.6	265.7	3266			
10	20:10:13	-11.005	-61.348	56.7	265.3	259.84	20:12:47	-11.056	-61.650	57.1	265.3	960			
11	20:12:57	-11.061	-61.670	57.1	265.3	263.14	20:16:25	-11.099	-62.089	57.5	265.3	1309			
12	20:22:15	-11.136	-61.958	59.2	265.1	4.90	20:24:42	-10.860	-61.957	59.9	264.9	917			
13	20:25:23	-10.783	-61.973	60.0	264.8	344.51	20:29:42	-10.312	-62.147	61.0	264.4	1626			
14	20:35:19	-10.123	-62.269	62.0	264.2	151.21	20:39:39	-10.532	-62.076	63.2	264.3	1621			
15	20:39:49	-10.547	-62.068	63.2	264.3	147.07	20:41:02	-10.659	-62.005	63.6	264.3	456			
16	20:41:18	-10.683	-61.989	63.7	264.3	138.55	20:44:09	-10.914	-61.802	64.5	264.3	1066			
17	20:51:02	-11.114	-61.646	66.5	264.0	303.55	20:53:06	-10.984	-61.859	66.8	263.9	773			
18	20:55:10	-10.807	-62.001	67.3	263.8	4.68	21:03:03	-9.922	-62.001	69.3	263.2	2948			
19	21:09:12	-9.681	-62.017	70.5	262.9	192.65	21:10:27	-9.816	-62.061	70.8	263.0	468			
20	21:12:26	-10.032	-62.081	71.2	263.0	171.00	21:14:01	-10.206	-62.070	71.6	263.0	598			
21	21:14:32	-10.258	-62.062	71.7	263.0	162.82	21:16:10	-10.430	-62.025	72.1	263.0	612			
22	21:22:40	-10.546	-61.936	74.1	262.7	350.62	21:27:41	-9.992	-62.085	75.2	262.4	1876			
23	21:32:03	-10.121	-62.254	75.9	262.4	126.54	21:38:24	-10.520	-61.732	77.9	262.2	2375			
24	21:42:42	-10.573	-61.948	78.9	262.0	354.60	21:45:00	-10.317	-62.000	79.5	261.8	861			
25	21:45:03	-10.311	-62.003	79.5	261.8	353.13	21:46:19	-10.170	-62.026	79.8	261.8	474			
26	21:46:32	-10.146	-62.028	79.9	261.8	349.69	21:48:16	-9.955	-62.075	80.3	261.7	649			
27	21:52:25	-10.067	-62.271	80.8	261.6	130.93	21:59:58	-10.609	-61.683	83.1	261.3	2828			
28	22:01:52	-10.713	-61.520	83.8	261.2	103.84	22:17:58	-11.146	-59.860	89.2	260.2	5958			
29	22:18:00	-11.147	-59.857	89.2	260.2	103.23	22:33:26	-11.552	-58.266	94.4	259.1	5684			

NUMBER OF FILES FOR THIS FLIGHT = 29
 TOTAL NUMBER OF SCAN LINES = 57943
 DATE THESE FILES WERE PROCESSED = 02-Mar-99
 DATE THIS LIST WAS CREATED = 03-Mar-99
 GRANULE VERSION = 9



FLIGHT 99-045

23-24 FEBRUARY 1999

R/C 806

MASSO / VIS / EDDP / AMPR / MIR / LIP